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ABSTRACTS

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(Pages refer to the Japanese originals of this volume unless otherwise noticed)

Über die Acetylmethylcarbinol- und 2, 3-Butylenglykol-Bildung durch Mikroben. (IV).

Über den Bildungsmechanismus beider Verbindungen.

(ss. 1~6)

Von Yukio TOMIYASU.

(Aus dem Agrikultur-Chem. Inst. der Kaiserlichen Kyushu Univers. Eingeg. am 7, Oct., 1937.)

Die vorbeugende und heilbare Wirksamkeit der Milch und der Milcherzeugnissen für die von überschüssige Zuckernahrung verursachten Hindernisse.

(ss. 7~18)

Von Dr. R. SASAKI u. M. KANDATSU.

(Aus dem Agrikultur-Chem. Inst. der Tokio Kaiserlichen Univers., Tokio,

Eingeg. am 27, Sept., 1937.)

In dieser Zeitschrift (Bd. 12, 1936) hat Dr. H. Ariyama angegeben, dass mit einem Futter, das bis zu 60 Proz. des Futters Rohrzucker zusammensetzt und mit alle bekannten Vitaminen ganz genügend sich versorgt, Ratten nicht normalweise erwachsen können und eigenartige Ernährungshindernisse zeigen. Aber für diese Hindernisse wirkt die Trockengahrhefe oder seine alkoholische Extraktzugabe von 0.5 g per Tagesdosis nicht nur deutlich vorbeugend sondern auch heilbar.

Die Eigenschaften dieser wirksamen Substanzen sind nach seiner Beschreibungen ziemlich verschieden von den aller bis jetzt anerkannten Vitaminen.

Da von aller Kenntnisse, Milch und Milcherzeugnisse, z. B. diese kondensiert Milch und das Milchpulver, als Kinder aufziehungsmittel mit vieler Rohrzucker-

versorgung von grösseren Mengen gebraucht sind, so vermuten wir das Vorhandensein der Wirksamkeit in der Milch, welche für die von überschüssige Zuckernahrung verursachten Hindernisse vorbeugend oder heilbar wirkt, dem Nährwert von Milch in dieser Seite ausschlaggebende Bedeutung zu geben.

Aus solcher Meinungen haben wir einige Experimente aufgestellt, um solche Wirksamkeit, unsere sogenannte „Zucker-schützende Faktoren“ in der Rohmilch, kondensierten Milch und Milchpulver, gezuckert oder nicht gezuckert, festzustellen, welcher Methode hauptsächlich nach Ariyamaschen Vorschrift folgern.

Unsere erreichte Resultaten sind folgendermassen :

1) Die Rohmilch hat die solche Wirksamkeit, und ihr Wirkungsgrad ist, zu ihrer Trockenmasse berechnet, ungefähr ein von Drittel oder Viertel von Trockengahrhefe.

2) In der erhitzten Rohmilch, die bei $96^{\circ}\sim 98^{\circ}\text{C}$ für 30 Minuten dauererhitzt wird, ist diese Wisksamkeit ganz oder von grösseren Teil zerstört.

3) Von dem Milchserum, welches von verdünnter Schwefelsäure enteiweisst wird, adsorbiert Sauretonpulver diese Wirksamkeit bei $\text{pH}=3.0$ in annahrender Vollkommenheit.

4) Die gezuckerte, kondensierte Milch (Zuckergehalt ungefähr 55%) hat diese Wirksamkeit ohne Zersetzen in solchen Grade wie auf ihrem Zuckergehalt sogenannte Ernährungshindernisse vorzubeugen und Ratten normalweise erwachsen zu lassen.

Über die ungezuckerte, kondensierte Milch können wir diese Wirksamkeit nicht feststellen, weil durch ihren zuvielen Wassergehalt Ratten nicht so schnell erwachsen können wie bei Kontrollversuche. Aber nach unseren Beobachtungen bei Durchführung der Versuche verhielt sich diese Milch so wie niedrigere Wirksamkeit als jene erhalten zu sein.

5) Das ungezuckerte Milchpulver hat die Wirksamkeit so viel als gezuckerte, kondensierte Milch.

Über die Ausführung der Versuche und Beobachtungen einiger uns interessierten Erscheinungen von Ratten hoffen wir im Originale zu berücksichtigen.

On Fatty Oils of Smoked Fishes.

(pp. 19~27)

By E. TAKAHASHI and Y. MASUDA.

(Agricultural Chemical Laboratory, Hokkaido Imperial University. Received Sept. 20, 1937.)

Fish oils are generally extremely susceptible to oxidative deterioration owing to their unsaturated fatty acid. But it is worthy of notice that the oils of smoked fishes stand long against oxidation, not giving off any fishy odor and maintaining good dietetic value.

Authors, undertaking the research on the nutritive value of fish oils, tried

first some studies on the characteristics of herring body oil and its antioxygenic properties in the process of smoking, the results of which will be summarized below.

1. Acid value, refractive index and iodine value were all increased in the course of smoking. Free fatty acid was increased, too, remarkably.

2. The oils developed strong antioxygenic properties after smoking. Oxygen absorption, peroxide value and Kreis test were inhibited extremely as compared with non-smoked fresh oils.

3. After saponification, the mixed fatty acid of smoked oils had no more antioxygenic properties. Unsaponifiable fraction of the smoked oils which were added to the fresh oils, had no influence on the antioxygenic properties of the latter, showed rather the tendency to urge the oxidation.

4. The oils which were exposed to the smoke directly were found to retard the oxygen absorption like the smoked fish oils. This is probably due to the phenols contained in smoke.

Colloid-chemical Studies on the Soluble Alginate. (I).

On the Viscosity of the Soluble Alginate.

(pp. 28~34)

By Noboru SUZUKI.

(Hakodate College of Fisheries, Received Oct. 4, 1937.)

Few studies have ever been reported of the colloidal behaviour of soluble alginates. This author investigated the effect of various conditions for the preparation of soluble alginates on viscosity.

This report consists of four divisions as follows:—

1. On the influence of kinds and concentrations of alkalies employed for the extractive material.

2. On the influence of preparation process.

3. On the influence of temperature.

4. On the influence of electrolytes.

The Change of Oxidation-reduction Potentials of Water-logged Soils. IV.

Influence of Proteins and Carbohydrates.

(pp. 35~42)

By Kisaburo SHIBUYA, Hideaki SAEKI and Kenhan RYU.

(Laboratory of Soils and Fertilizers, Taihoku Imperial University,

Received Oct. 25, 1937.)

It plays an important rôle on the practice of agriculture that the change of

oxidation and reduction potentials of soils is differently influenced by characteristics of organic matters which are applied into the soils as manurial substances. The organic matters, in this occasion, are nitrogenous compounds or proteins and carbohydrates. Burrows and Cordon, recently, studied on the potential change of soils by application of these materials in an upland condition. They recognized, thereupon, the potential of the soils markedly changed toward positive, in accordance with decomposition of proteins, while it moved toward negative by decomposition of carbohydrates. The potential change of soils by application of the same materials under water-logged condition should be, however, different from that in the upland condition.

An investigation on this subject has been carried out by the authors, using three kinds of soils and three kinds of manurial substances. The soil samples are a soil of sandstone and shale origin, a humus loam and a lateritic clay, and the manurial substances are casein and mannite, as the representatives of proteins and carbohydrates, and sulphate of ammonia. The last one has been used, being an inorganic nitrogenous compound, in behalf of comparison to casein. The method of investigation has followed that which was described in previous papers (I—III). Determinations and measurements were continued for ten weeks. In consequence;

(1) The potential of soils added mannite, as already pointed out in the previous papers, rapidly decreases at the early stage of water-logging, gradually rising up, again, in the later period. Whereas the potential of soils added casein almost does not rise up after very marked depression.

(2) The potential depression more greatly occurs in soils added casein than in those added mannite.

(3) The potential changes of soils were mixed with both mannite and casein fall, without exception, between two limits which are respectively shown by each. They regularly lean to the characteristic limit according to value of carbon-nitrogen ratio of the organic mixture.

(4) Nature of the potential changes of soils added protein or carbohydrate varies each other between different conditions, upland and water-logged. It depends upon the biological activities whether is aerobic or anaerobic. This is explained by oppression of their activities using a small dose of $HgCl_2$.

(5) Influence by sulphate of ammonia on the potential change of soils is similar to that by casein. However, the potential depression of soils by the former is not so great as by the latter.

In short, the change of oxidation-reduction potentials of soils is differently influenced by addition of protein or of carbohydrates. It is, also, different between upland and water-logged conditions. Sulphate of ammonia influences on the potential change of soils, similarly to the organic nitrogenous matter, casein.

Biochemical Studies of the Locust (IV).

(pp. 43~44)

By Chikafumi ICHIKAWA.

(The Soma Agricultural and Sericultural School, Received Dec. 2, 1937.)

Biochemical Studies on Glutathione. The Third Report.

Glutathione content in Venous Blood of Rabbits.

(pp. 45~48)

By Masayoshi OGAWA.

(Tokyo Municipal Hygienic Institute, Received Oct. 20, 1937.)

The author has already studied arterial and venous blood in rabbits as to the glutathione content, normal or under the influence of ultraviolet irradiation. In the present report, the author compared, in similar condition, the glutathione content in blood samples from (1) auricular vein, (2) jugular vein, (3) hepatic vein, and (4) various parts of the right cardiac auricle in virisected rabbits. Method of OKUDA and the author was used.

It was proved that the glutathione content of venous blood was practically constant except in the samples obtained from the right cardiac auricle, which showed slight variations according to the different parts of the right auricle.

Biochemical Studies on Glutathione. The Fourth Report.

Glutathione content in Venous Blood of Rabbits under
Latent influence of A-Avitaminotic Diet.

(pp. 49~51)

By Masayoshi OGAWA.

(Tokyo Municipal Hygienic Institute, Received Oct. 20, 1937.)

The author determined the glutathione content of rabbits, fed for certain length of time on A-avitaminotic diet. At the time when the avitaminose symptoms were not yet manifest, the total glutathione content of venous blood in these

Glutathione per 100 g blood.

	Before dieting				After dieting for 17 days				15 days after interruption of dieting			
	Avitaminotic group (I)		Controls (II)		Avitaminotic group (I)		Controls (II)		Avitaminotic group (I)		Controls (II)	
GSH	45.64	100	40.00	100	36.96	80.9	34.79	86.9	44.90	98.3	36.97	92.4
GS-SG	10.02	100	13.53	100	22.45	224.0	23.67	174.2	16.87	168.3	16.04	118.5
Total	55.66	100	53.53	100	59.41	106.7	58.46	109.2	61.77	110.9	53.01	99.0

rabbits (I) did not show any deviation from that of control animals, (II) but the reduced glutathione content is decreased in some degree and then oxidized glutathione content is rather increased in these animals (I).

On the Method of Quantitative Estimation of Ascorbic Acid in Tissues.

(pp. 52~64)

By Masayoshi OGAWA.

(Department of Nutrition, College of Medicine, Nippon University. Received Oct. 20, 1937.)

In 1933 Okuda and the author proposed a method for the quantitative estimation of glutathione extracting it from tissues with sulfosalicylic acid solution. Based upon the same principle of our method, Woodward pointed out the superiority of sulfosalicylic acid for indophenol titration of ascorbic acid to trichloroacetic acid. Afterward the author found that titration of ascorbic acid with indophenol solution in sulfosalicylic acid gives no reliable results. Sulfosalicylic acid is more effective as a protein-precipitant than meta-phosphoric acid, but the latter is superior to the former as the solvent of ascorbic acid. Accordingly the author found that the mixture of these two acid solutions is the most effective as a protein precipitant besides the autoxidation of ascorbic acid is considerably cut down.

In the present communication, the author proposed a method for the estimation of ascorbic acid extracting it from tissue with a mixture of sulfosalicylic acid and meta-phosphoric acid, applying the procedure of Birch, Harris and Ray on the acid filtrates.

Principle:—Tissues are freed from proteins by means of a mixture of sulfosalicylic acid and meta-phosphoric acid, and the filtrate from the protein-coagulum is divided into 2 portions. In one portion, the titration method of Birch, Harris and Ray is used and reduced ascorbic acid is determined. In the other portion which was kept under an atmosphere of hydrogen sulphide for about 12 hours, after removing hydrogen sulphide by a stream of inert gas such as CO_2 , total ascorbic acid is determined. Reversibly oxidized ascorbic acid is calculated from the difference. For the titration of pigmented extract, several methods of removing the interfering pigment were tried, but it was found that in each case in which the colour was removed a part of ascorbic acid was also removed or destroyed. In this report the author described a method using colorimeter for the titration of pigmented extract. By means of this method it has been found possible to account 100% of added ascorbic acid.

On the method of quantitative estimation of glutathione in tissues.

(Biochemical Studies on Glutathione. The Fifth Report.)

(pp. 65~72)

By Masayoshi OGAWA.

(Department of Nutrition, College of Medicine, Nippon University.

Received Oct. 20, 1937.)

Okuda and the author (1933) published an iodometric method for the determination of glutathione extracting it from tissue with sulfosalicylic acid. The principle of the method is to titrate in the acid solution in the presence of iodide with a standard iodate solution, and the results of titration are all calculated as glutathione.

Ascorbic acid is a constituent of tissue which reacts with iodine, and therefore is included in the iodate titration value for glutathione.

In the present communication the author described a method of estimating glutathione in tissue and in biological fluids according to the fact that in many case glutathione and ascorbic acid like material are the only substances which react with iodine in the iodate titration, and the iodate titration value gives the sum of these two substances quantitatively.

Principle :—Tissues are freed from protein by means of sulfosalicylic acid and the filtrate from the protein coagulum is divided into 2 portions. In one portion iodate value (equivalent of GSH + ascorbic acid) is determined and calculated as GSH (A). And in the other ascorbic acid is determined by means of 2:6-Dichlorophenol-Indophenol titration. Multiplying the coefficient 4.1 by ascorbic acid value obtained by 2:6-Dichlorophenol-Indophenol, ascorbic acid can be calculated as reduced glutathione (B). GSH :—The quantity of true reduced glutathione is obtained by the difference between the GSH value (A) and (B). GS-SG :—After the reduction of oxidized glutathione into the reduced form by means of zinc dust, total GSH is determined according to the above stated procedure. The quantity of oxidized glutathione is obtained by the difference between the total and pre-existing GSH.

In order to ascertain the accuracy of the present method, the following quantities of reduced glutathione and ascorbic acid were added to water, tomato, and milk respectively, and the determinations were made by means of the method, with the following results :—

mg %	GSH and ascorbic acid content of samples		GSH and ascorbic acid added		Total		GSH equivalent of GSH + ascorbic acid	ascorbic acid value (indophenol)	GSH equivalent of ascorbic acid	GSH found	
	GSH	V.C.	GSH	V.C.	GSH	V.C.				mg %	% ¹
In Water	0	0	17.05	5.44	17.05	5.44	39.01	5.39	22.10	16.90	99.12
In Tomato	14.25	15.30	64.25	17.85	78.50	33.15	212.30	32.75	134.28	78.02	99.38
In Milk	6.30	0.90	20.80	39.40	27.10	40.30	189.00	39.40	161.50	27.50	101.40

From these results it is clear that added glutathione was nearly recovered theoretically.

**Die Untersuchungen über die Microorganismen von
Zuckerrohrsäfte. II Mitteilung**

(ss. 73~85)

von R. NAKAZAWA, Y. TAKEDA und U. SUEMATU.

(The Department of Industry, Government Research Institute, Taiwan.

Zugegangen am 10, Oct. 1937.)

**Researches on the Manufacture of Alcohol from the
Manchurian starchy Materials (Part IV).**

(see the last No. 159)

(pp. 86~92)

By E. YOSHINO and M. OKABAYASHI.

(Central Laboratory, South Manchurian Railway Co., Ltd. Received Oct. 5, 1937)

Experiment on the Colon Group of Fishes. (VI) (continued)

(pp. 93~114)

By Yutaka YASUKAWA.

(The Department of Food Control of the Government Institute from Infectious Disease,
Head of the Department: Dr. Y. Tohyama. Received June 10, 1937.)

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報 文

微生物に依る Acetylmethylcarbinol 及び

2, 3-Butyleneglycol 生産に就て (第4報)

Acetoin 系化合物の生成機構に就て

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昭和12年10月7日受理

Acetoin 系化合物の生成機構に關する研究は最初に Harden⁽¹⁾ に依りて試みられ次いで Neuberger⁽²⁾ 一派の詳細なる研究に依り酵母菌に關する限り或る點迄は闡明せられたるが如しと雖も細菌類絲狀菌等に就ては所見を異にせる人もありて完全に解決せりとは云ひ難し。

Neuberger 等は醗酵の中間生成物たる發生期の acetaldehyde が carboligase の作用に依りて acyloin condensation を受け acetoin に變じ此の acetoin の還元に依りて 2, 3-Butyleneglycol (以下單に glycol と記す) を生ずるものなりと説けり。著者は是等の實驗を追試して acetaldehyde より acetoin を得更に diacetyl 及び acetoin の植物化學的還元に依りて glycol を得逆に glycol より acetoin を得たるを以て是等の化合物の變轉經路に就ては氏等の説を肯定せんとするものなり。然れ共最初に惹起せらるゝ acyloin condensation の機構に就ては Neuberger と稍々所見を異にし獨自の見解を抱懐するものなり。更に著者は種々の hydrogen-acceptor を使用して研究することに依り其の生成機構を明確にし次に細菌類絲狀菌類に依る生成機構に就ても些か研究を行ひ醗酵微生物全般に涉りて生成機構を略々究明し得たりと信ずるを以て報告せんとす。

實 驗 之 部

I. 亞硫酸鹽に依る acetoin 生成の遮斷

酵母に依る acetoin の生成は亞硫酸鹽の添加に依り遮斷せらることは既に Neuberger に依りて報告せられたり。然るに酵母菌以外の微生物殊に細菌に於ては glycol が acetoin の先行物質なるが如しと説く者もあるが故に著者は亞硫酸鹽に依る捕獲法を細菌類及び絲狀菌類に應用せり。亞硫酸鹽としては新に合成せる亞硫酸石灰を使用せり。(酸性亞硫酸鹽は餘り有效ならず) 實驗成績は次の如し。

實驗第一: 細菌2株, 不完全酵母菌1株, 絲狀菌2株を麹汁(24℃ 10%) に1白金耳宛移植し亞硫酸鹽を添加せしものと然らざるものとに於ける兩物質の生成量を比較せし結果は第1表の如

し。即ち添加したるものに於ては acetoin 及び glycol を共に生成せざることを確めたり。(細菌類は中性糖汁に培養せり)

第 1 表

Microbe	CaSO ₃ (%)	time in day	temp.	acetoin	glycol
Bac mes fuscus	5	7	37	—	±
	—	7	"	+++	+++
Bacillus natto	5	7	"	±	±
	—	7	"	+++	+++
Aspergillus niger	2.4	14	"	—	—
	—	14	"	+	—
Mucor racemosus	5	7	"	±	—
	—	7	"	++	—
Oidium lactis	4	7	30	—	—
	—	7	"	++	+

實驗第二— 壓搾麥酒酵母 4g を N/10 pyruvic acid 40 cc 及 3% acetaldehyde 40 cc に添加し 20 時間 30°C に於て作用せしめたる後 acetoin の檢出を行ひたる結果は第 2 表の如く亞硫酸鹽の添加に依り其生成は全く阻止さるることを知れり。acetaldehyde のみより多量の acetoin が生成することと併せ考ふるに Neuberg 説の如く acetaldehyde を經過する事は確實なりと云ひ得べし。

第 2 表

No.	medium	CaSO ₃ (%)	acetoin	No.	medium	CaSO ₃ (%)	acetoin
1	N/10 pyruvic acid	5	—	3	N/10 pyruvic acid	0	++
2	" " "	2.5	±	4	3% acetaldehyde	0	+++

上記の如き實驗結果より案するに acetoin 生成が亞硫酸鹽に依りて全く遮斷せらるること及び acetaldehyde の添加に依り其の生成量を著しく増加する事實は acetoin 生成に於てアルデヒドの段階を經過することを明瞭に物語るものなり。而して glycol が acetoin の前段階物質なりといふ事も考へ得ざることを知るべし。尙 Mazé⁽³⁾ 等の考へたるが如く pyruvic acid より直接 acetoin を生成せざることも分明せり。

II. 培養中に於ける兩物質の消長

培養液 - peptone 2%, glucose 5%, table salt 0.5% の割合のものを 50 cc 宛 100 cc 容量の三角瓶に盛りて加壓殺菌す。

供試菌類 - Bacillus lactis aerogenes No. 418, N. C. T. C.

接種量 - ブイヨン寒天斜面培養(24 時間)より 1 白金耳を採りて上記の如き成分の培養液 8 cc に懸垂したるものよりカピラーにて 3 滴宛接種せり。

培養温度 - 37°C

實驗第一 - 振盪したる場合

炭酸石灰の効果を満足ならしめんがため及び通風に依る効果を豫想して兩方共毎日 1 回宛振盪せり。表中の數字は試料 20 cc より生成せしめたる Nickel dimethylglyoxime の mg 數なり。

第 3 表

CaCO ₃	product \ day	1	3	5	7	9	11	14
not added	acetoin	7.7	9.2	10.8	10.8	10.5	13.3	9.0
	glycol	18.4	20.0	21.3	22.3	23.8	25.8	26.0
added	acetoin	4.2	19.0	21.4	22.1	10.8	4.4	2.1
	glycol	26.0	46.8	114.3	108.2	114.5	119.9	123.2

第 3 表に見るが如く振盪は生成に著しき悪影響を及ぼしたるを以て次回は静置することとせり。

実験第二： 静置したる場合

実験は実験第一と同様に施行せり。(但し静置)

第 4 表

CaCO ₃	product \ day	1	3	5	7	9	11	13	15	18	21
not added	acetoin	7.6	9.0	12.5	12.0	16.1	16.8	17.0	17.2	15.3	16.0
	glycol	18.8	26.7	27.5	42.1	44.0	49.2	71.2	91.3	113.3	115.4
added	acetoin	3.8	18.0	13.5	7.8	6.4	1.0	trace	trace	trace	trace
	glycol	29.5	89.5	147.9	180.0	208.5	131.0	99.5	96.5	88.0	77.5

是等の結果より論ずるに炭酸石灰の添加は生育に好影響を齎すと共に兩物質生成にも効果あり。但し acetoin に在りては一旦生成されたるものが次第に消失す。其の行方に就ては稿を別にして詳細に論議すべしと雖も振盪が大なる阻害作用を及ぼすことは豫想外の結果なり。一般に acetoin 系化合物をなるべく多量に生成せしむるためには使用する菌種が概ね好気性なること及び空氣の hydrogen-acceptor としての作用を考慮に入れて培養中盛んに通風するを常⁽¹⁰⁾とし居れども此の結果より論ずれば通風は有害無益なることを知る可し。尙 acetoin は更に第二段の變化を蒙れども glycol は二次的變化を餘り受けざるが如く此の點より論ずるも acetoin が glycol の先行物質にして glycol は醗酵の最終生成物と見做すを以て妥當とすべし。

同様の實驗は *Bacillus natto* 及び *Bacillus mesentericus fuscus* に就ても施行し略々同様な結果を得たり。但し酵母菌類に於ては静置する場合には主として酒精醗酵のみが行はるれ共通風すれば酸素の酸素受納作用に依りて acetaldehyde は酒精への還元を免るが故に acetoin を生成せしむることを得べし(此の目的のためには激しく通風することを要す)。

III. Acyloin condensation と Hydrogen-acceptor

Kluyver⁽⁹⁾ に依れば砂糖の醗酵に於て中間的に生成せらるる acetaldehyde は同時に生ずる水素に依りて還元せられて酒精となるが故に空氣(酸素)、硫黄、methyleneblue の如き hydrogen-acceptor を豫め添加し置けば水素に依る還元を免るが故に生成せられたる acetaldehyde は主として acyloin 縮合に利用せらるることを得べしと説けり。著者は此の説を追試し酵母菌に依る砂糖醗酵の場合通風は實際に好影響あることを知れり。而して硫黄、硝酸加里及び methyleneblue の効果は空氣に及ぼさず、更に著者は cyatin が hydrogen-acceptor として働き得るやを試験せしに良好なる acceptor たり得ることを知れり(第 5 表)。此の結果よりするも acetoin 生成はアルデヒドの段階を経過

すべきことが首肯し得る。

acetoin 生成に對する cystin の効果は次の如き實驗方法に依りて試験せり。即ち壓搾麥酒酵母 10g を 50 cc の 10% glucose に加へ之に種々の量の 20% シスチン鹽酸液を添加し 31°C に於て 15 時間作用せしめたる後 acetoin の檢出を行へり。緩衝劑としては磷酸加里を使用せり。

第 15 表

No.	20% cystin	pH	acetoin	No.	20% cystin	pH	acetoin
1	1 cc	6.8	—	3	not added	6.8	—
2	3 cc	6.5	+				

IV. Acyloin condensation の機構に就て

以上記載したる實驗結果に依り acetoin の生成経路は明瞭になれりと云ひ得べし。即ち acetaldehyde の縮合に依りて acetoin を生じ此の物の還元に依りて glycol を生ずるものなるべしとする説は Harden に依りて着想せられ Neuberg に依りて酵母菌のみに就ては略々闡明せられ居りしが細菌、絲狀菌に就ての著者の研究に依りて醗酵微生物全般に涉りて同様の経路を辿るものなること今や略々明瞭となるに至れり。

然るに最初に惹起せらるる acetaldehyde の縮合機構に就ては特殊酵素説 (Neuberg 一派) と之を否定する説を唱へる者 (Kluyver⁽¹¹⁾, Kostyschew⁽¹²⁾, Dirscherl⁽¹³⁾ 及び Langenbeck⁽¹⁴⁾ 等) とありて最近迄解決せられ居らざりしか著者は最近 Neuberg の所謂 carboligase の存在を確證し得たること既報⁽⁵⁾⁽⁶⁾ の如し。

著者⁽⁷⁾ は acyloin 縮合の純化學的可能を最初に唱へたり。然れども化學的可能の故を以て直に酵素の存在を否定せんとするものには非ざりき。酵素の存在も考へたれども Neuberg の所見とは相違するものなりき。即ち Neuberg & Simon (1925) は carboligase の作用には發生期の acetaldehyde が必要不可欠なりとせるに反し著者は然らざることを實驗的に證明することを得たり⁽⁷⁾。即ち glycogen を全く含まざる酵母を調製し之を acetaldehyde 液に作用せしめて acetoin を生成せしむることを得たり。更に乾燥酵母に依りて遂には酵母浸出液に依りて酵素的に acetoin を生成せしむることに成功せり。而して茲に生成したる acetoin は生活酵母に依りたる場合も酵素に依りたる場合もすべて光學的活性にして比旋光度もすべて略々相等し。加之生活酵母を用ひたる場合砂糖の存否は acetoin の比旋光度に全く無關係なりき⁽¹⁵⁾。是等の事實は acyloin 縮合が特殊酵素の作用に因由せるものなることを充分に裏書するものなりと信ず。

要之 acyloin 縮合は化學的にも惹起せられ得べし。然れども醗酵液に見出さる acetoin は本來光學的活性のものにしてすべて特殊合成酵素の作用に依りて生成せらるるものなることは今や明確になれりと云ひ得べし。acyloin 縮合に發生期の aldehyde の必要不可欠なることは定説として一般に信ぜられ居れども以上の事實は該説の撤回を主張せしむるものなり。

考 察

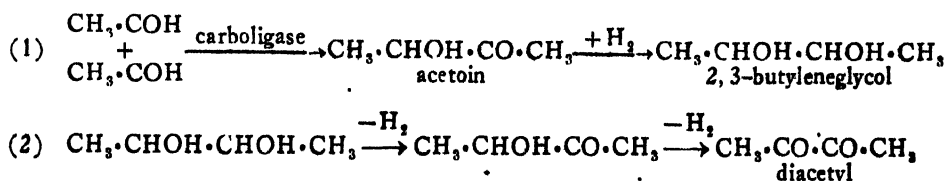
以上記載したる實驗結果を縮合考察すると次の如し。即ち砂糖及びビルビン酸の醗酵液に亜硫酸鹽を添加すれば acetoin 系化合物の生成を全く遮斷し得ること及び種々の hydrogen-acceptor の添加に依りて acetoin を生成せしめ若しくは生成量を増加せしめ得ることは acetoin の生成が必ず

アルデヒドの段階を経過すべきものなることを説明するものなり。更に細菌類を長期に亘りて培養する場合 acetoin の量は比較的速に max. に達したる後次第に減少すれども glycol の量は長時間に亘り次第に増加の傾向を辿ることは acetoin が glycol の前段階物質にして glycol が最終生成物なることを説明するものにして此の事實は亜硫酸鹽の添加に依り acetoin 及び glycol の生成を全く遮断し得たる事實と相俟ち glycol 先行説を完全に打破するものなり。要之 acetoin の生成は必ず acetaldehyde の段階を経過すべきものにしてピルビン酸の縮合或は glycol を經過せざることが明確となるに至れり。

而して acetaldehyde の縮合は特殊酵素に依りて惹起せらるるものにして此の際 acetaldehyde は必ずしも發生期の状態に在る必要なきものなり。

次に glycol 及び diacetyl の生因に就き考察すべし。glycol を以て acetoin の先行物質なりとする論者もあれど然らば glycol の生成機構如何と云ふに全く不明なり。著者は以上記載したる論據に基き glycol は acetoin が hydrogen-acceptor として作用したる場合 acetoin の還元に依りて生成するものなりとする Neuberg 及び Kluyver の説を肯定せんとする者なり。尤も一旦 acetoin を經過して生成したる glycol が acetoin に逆酸化することに就ては報告あれども是は二次的現象なると幾多の實驗結果に依りて容易に背き得らるることなりとす。diacetyl は常に微量に存在するものにして此の物の生成は acetoin 若しくは glycol の酸化に因由せるものなりと思考するを妥當とすべく一次的の醗酵生産物なりとは考ふことを得ず。

要之 acetoin 系化合物はすべて其の源を acetaldehyde に發するものにして其の生成経路は次の如き關係式にて表示することを得べし。



附記 Ciusa⁽⁶⁾ (1932) は pepsin を牛乳に作用させる場合及び trypsin 又は papain を全乳、卵白及び血清に作用させる場合 acetoin の生成せらるることより acetoin は砂糖よりは非ずして蛋白質より生成せらると報告したれども斯かる事は遂に信用し得ざることなりとす。又 Lafon⁽⁷⁾ (1932) は *Bacillus subtilis* に依る acetoin の生成は酵母菌の場合と異なる由報告せり。微生物の種類に依りては例外的に特異なる生成経路を辿るものありや否やに就ては今後の研究に俟たざる可らず。

摘 要

(1) 亜硫酸石灰を醗酵液に添加すれば acetoin 及び 2, 3-butyleneglycol の生成を全く遮断し得ることを酵母菌のみならず細菌類糸状菌類中兩物質生産力の旺盛なる菌種に就き證明せり。

(2) ピルビン酸の醗酵液に於ては常に多量の acetoin を生成すれども之に亜硫酸石灰を添加すれば acetoin を生成せず。

(3) 細菌を長期に亘りて培養する場合には菌種に依りては一度生成したる acetoin を比較的速に消費するものあり。之に反し 2, 3-butyleneglycol の量は長期間に亘りて漸増の傾向を辿る。

(4) Hydrogen-acceptor として空氣、硫黃、硝酸加里及び methyleneblue の外に新に cystin を使用して糖く目的を達することを得たり。

(5) acyloin 縮合の機構に就き所見を簡単に記載せり。

(6) 2,3-butyleneglycol 及び diacetyl の生因に就き考察し acetoin 系化合物の生成機構を式示せり。

稿を終るに當り御指導を忝うせし恩師湯川、山崎兩先生に誦みて謝意を表す。

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牛乳及乳製品の蔗糖過剰障害に對する防治効果に就きて

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緒 言

曩に有山氏⁽¹⁾及松岡氏⁽²⁾等は動物試験の配合飼料に炭水化物として蔗糖を用ひると之を與へたる白鼠は 2~3 週間にして特有の營養障害を起して斃死し、生存するものでも其の營養狀態が極めて貧弱となり、若し是れに乾燥酵母を添加供與すれば標準に近い發育をなし、完全に其の營養障害を防治し得ることを報告した。次いで有山氏⁽³⁾は乾燥酵母に就いて該有效物質の諸性質を調査したる結果從來知られたるビタミン類に一致しない點のあることを指摘し、又松岡、市場⁽⁴⁾、道及丹下⁽⁵⁾の諸氏は酵母、米糠、牛肝臓等にて該有效成分の諸性質を検索した結果を述べて居る。

煉乳や粉乳には多量の蔗糖を含むものがあり此等は母乳代用品として廣く用ひられる。又牛乳を飲用に供し或は母乳の代用となす場合にも甘味料として蔗糖を加へることが多い。

されば若し蔗糖の過剰が乳兒の發育に障害を起すときに牛乳に之を防治する効果が無いとすれば由々しき大事と考へる。依て牛乳、煉乳及粉乳について是れに加へたる多量の蔗糖による營養障害を防治する効果の有無及其程度を確める爲に前研究者の實驗方法にならひ試験動物として白鼠を用ひて實驗した。

其の結果生牛乳は蔗糖による營養障害を防治する效力を有し、之を高溫に加熱すれば其の效力が減減する。又加糖煉乳及粉乳は該有效成分に因ると考へられる效力を表はすことを知つた。

就ては是れに關する實驗の成績を茲に報告する。牛乳及乳製品の新營養價につき資料となることを得れば幸である。

實 驗 及 考 察

1. 試験動物及飼料の調製

試験動物としては體重 30~50g の雄白鼠を用ひる。是れに 1 週間基本飼料を與へて豫備飼育をなし其の内より外觀上同等と認められるもの 3~5 匹を選んで 1 群とし、1 匹飼ひにする。

飼料は各區同量となる様に制限食となし可及的に全部食ひ盡さしめる様に供與量を加減する。供試飼料の精製法は次の如くである。

カゼイン及澱粉 局方カゼイン及局方馬鈴薯澱粉を約倍量の蒸留水に 1 夜浸漬してから壓搾して洗滌することを 3 回反覆し、次に約同量の 50% 及 95% のアルコールを用ひて順次に數時間攪拌し

更にエーテルにて浸出し、最後にエーテルを室温にて揮散せしめる。

バター 純良品を熱湯にて洗滌すること洗液の全く透明になる迄反覆したる後 50% アルコールを用ひて數回浸し、尚ほ最後に水洗してアルコールを除き冷蔵庫に保存する。

豚脂 局方豚脂を 95% 温 (60°) アルコールに入れてよく攪拌したる後 1 晝夜置いてから濾取する。この操作を 3 回繰返してから蒸氣浴上にて乾燥し之を冷蔵する。

乾燥卵白 鶏卵白を綿布にて濾過し、之を平盤に薄層となし温浴上にて送風機を用ひて乾燥後粉末となす。乾燥時の温度は 45~50° である。

飼料のビタミン B₂ 效力 飼料のビタミン B₂ 給源として用ひる爲に前記乾燥卵白並に後記卵白吸着白土及牛乳吸着白土の效力につき次の如き實驗を行ふ。

ビタミン B₂ 吸着白土を調製するには生牛乳に就ては是れに氷醋酸を滴加し攪拌してカゼインを凝固せしめる。之を綿布にて濾去し尚ほ壓搾して濾液 (反射光に美麗な緑黄色を呈する) を集め更に氷醋酸を加へて pH=3.0 とす。是れに牛乳の乾物 (約 12% と見做す) の 10 分の 1 量の局方酸性白土を加へ振盪機を用ひて 5 時間振盪してから 1 夜置いて白土を沈澱させる。然る後上澄液を傾斜して分ち又白土を吸引濾過して、傾斜液及濾液を合し是れに更に等量の白土を加へて前と同様に操作する。次に兩回の白土を合し、醋酸酸性となせる水、アルコール、エーテルにて順次に洗滌し、之を褐色硫酸乾燥器中に貯へる。此の吸着白土 0.1g は牛乳乾物の 0.5g に當る。

卵白吸着白土を製するには乾燥卵白粉末に約 3 倍量の 50% アルコールを加へ、光を遮り乍ら 60~70° に 5~6 時間温浸したる後浸液を吸引濾過する。尚ほ同様の操作を 3 回反覆する。然る後濾液を合し褐色容器を用ひて低温にアルコールを蒸發し、是れに醋酸水を加へて pH=3.0 とし更に酸性白土を加へて吸着をなし、其の後の操作を前記牛乳の場合と同様に行ふ。

動物試験に供したる飼料は次の如くである。

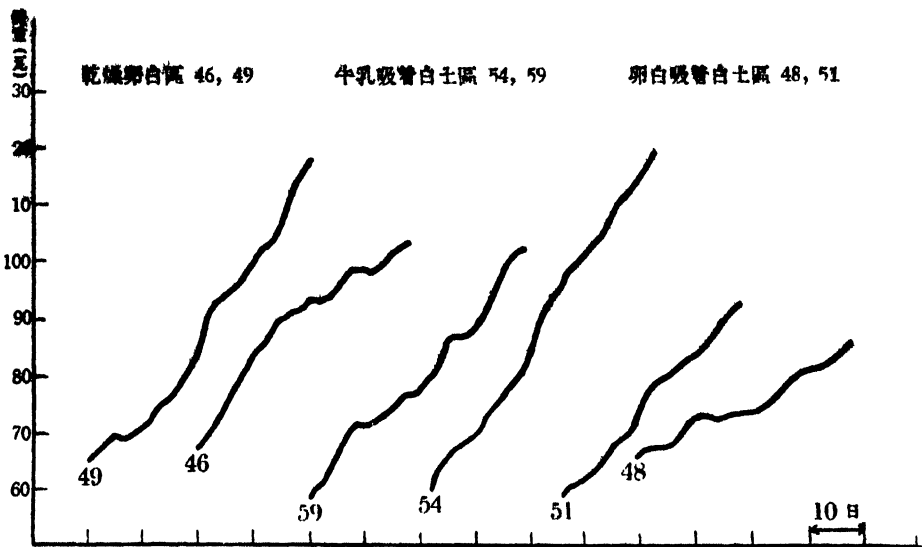
飼料組成 (%)

馬鈴薯濃粉	68
カゼイン	18
バター	10
マ氏鹽 No. 185	4
オリザニン	1 日 1 頭當り 5g (三共 10 倍強力オリザニン 1cc を蒸溜水にて 100cc に稀釋し其の 1cc を與へる)
供試品	" 0.5g 相當量

上記の飼料にて約 6 週間飼育したる経過は第 1 圖の通りである。

考 察

此の成績に依り考察すれば乾燥卵白及牛乳吸着白土の效力は殆んど差異が無く 42 日間の飼育により體重 40~60g より 100~120g に増加し、其の他に何等の病徴も認められない。然るに卵白吸着白土の效力は著しく劣り、同期間に體重が僅かに 20~40g を増加したにすぎない。即ち乾燥卵白及牛乳吸着白土をビタミン B₂ 給源として乾物量 1 日 1 頭當り約 0.5g を與へれば此の程度の發育は可能であることを知り得たから、是れ以後の實驗の判斷の標準とする。但し本試験の發育結果が他のビタミン B₂ 試験の結果に比して概して劣つて居るのは、制限食のためであり又特に效力の少い卵白吸着白土が制限因子となつた爲であると考へられる。

第1圖 飼料のビタミンB₁效力試験 (昭和11年9月16日~11月4日)

2. 牛乳の效力試験 (第1回)

牛乳の效力を試験する爲に夫れより滓乳を分別し之を濃縮したるものに就て實驗した。動物試験の方法は前試験と同じにし、以下各項に於ける試験方法も亦同様である。即ち蔗糖を配合したる基本飼料に供試品を添加して其の效力を試験した。

基本飼料の組成 (%)

蔗糖 (周方白糖)	62	マ氏鹽 No 185	4
カゼイン	18	ビタミンB ₁ 1日1頭當	5γ
バター	10	乾燥卵白	0.5g

牛乳より滓乳濃縮物の調製 生牛乳 35 kg を取り先づ是れに稀硫酸を滴下して攪拌しカゼインを凝固せしめ、綿布を用ひて濾過し、凝固カゼインを蒸溜水にて能く洗滌する。次に濾液及洗滌を合して 60° に 30 分間保ちてアルブミン及其他を凝固せしめ、是れに石灰水を加へて pH=7.0 となし1夜置いてから沈殿を濾去して緑黄色の螢光を呈する透明液を得。此の濾液に精製炭酸瓦斯を通じつつ日光を避け 55~60° にて減壓濃縮する。次に濃縮物を蒸發皿にとり真空鹽化石灰乾燥器に約2週間置いて僅に黄色を帯びる吸濕性粉末物の收量 256g を得。即ち此處に得たる滓乳濃縮物の 0.3g は牛乳乾物約 0.5g に當る。

考 察

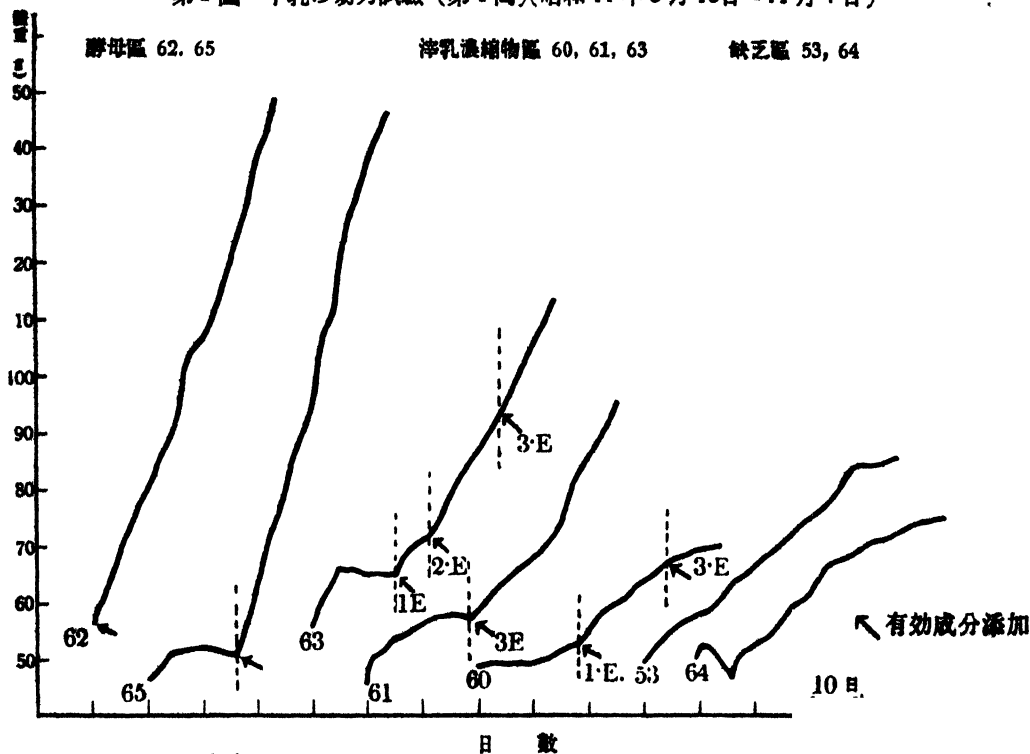
基本飼料を用ひて飼育した白鼠は有山氏の實驗の如く、3~4 日間は體重を増加したが 10~15 日間に全く體重の増加が停止し、毛並に光澤を失つて粗となり、時々朝に衄血を認めるに至つた。其の後、是れ等の栄養障害を起した動物に滓乳濃縮物又は乾燥酵母 (オリエンタル印) を與へたるに治癒状態は第2圖に示す如くである。即ち乾燥酵母は1日1頭0.5g の供與によつて充分治癒の目的を達するが滓乳濃縮物は 0.5 と牛乳乾物相當量では不充分であるが其の約3倍量と與へれば酵母に匹敵し得るが如き結果を得た。但し白鼠 No. 53 は缺乏鼠なるにも拘らず栄養状態が比較的悪化する

ことなく體重 95g 迄増加し、又 No. 60 は母乳濃縮物を 1 日 1 頭當 1.0g を與へても、充分栄養状態を回復し得なかつた。此の點に就ては白鼠の個性の相違とも見られるが、是れ等の例外の爲に該有效成分が牛乳に存在すると斷定するに多少の疑問を残すので更に次の第 2 回實驗を行つた。

3. 牛乳の効力試験 (第 2 回)

第 1 回試験により大略を牛乳には乾物として、乾燥酵母の約 $1/3 \sim 1/4$ の有效成分の存在することを認めたが、未だ充分確認するに至らないので、此の回はバターの代りに精製ラードとビオスチリンとを以て置き換へて豫防及缺乏試験を行ふ。

第 2 圖 牛乳の効力試験 (第 1 回)(昭和 11 年 6 月 16 日～11 月 4 日)



基本飼料組成 (%)

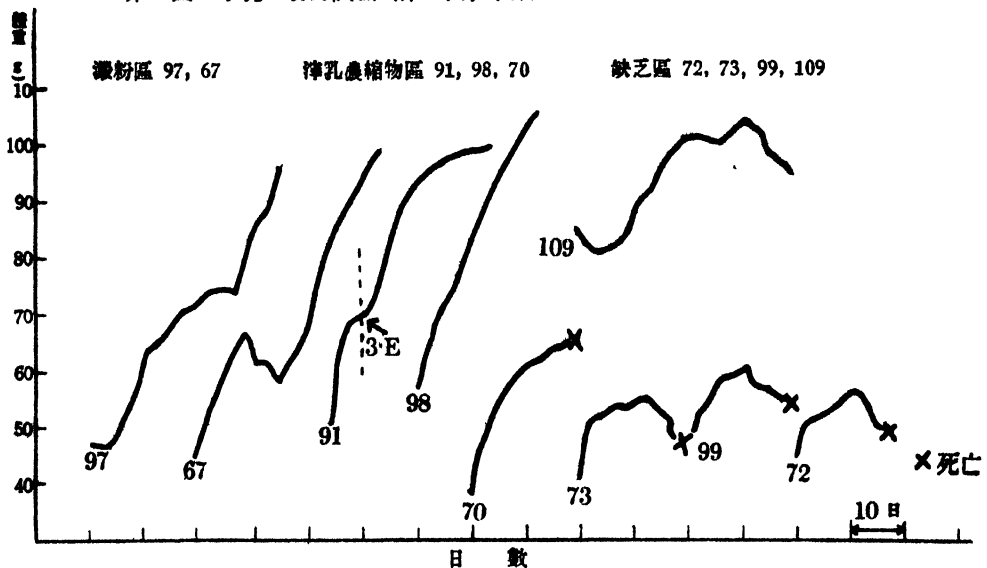
蔗糖 (局方白糖)	68
カセイン	18
豚 脂	10
マ氏鹽 No. 185	4
ビオスチリン (1 日 1 頭當)	50γ (理研ビオスチリン 1 管を局方オリーブ油に溶かして 50g となし、其の内約 0.3g を與へる)
ビタミン B ₁ (1 日 1 頭當)	5γ
乾燥卵白	0.5g
母乳濃縮物	1.5g (牛乳乾物相當量)

考 察

本試験に於ては對照區として蔗糖の代りに澱粉を溶ひたる飼料區を設けた。即ち前記ビタミン B₁ 効力試験飼料に乾燥卵白を 1 日 1 頭當 0.5g 添加したものである。初めの間加熱細化せず與へ

たるに 3~5 日間に黄白色の軟便を多量に排泄し、消化不良の爲に體重を減じたので其の後は蒸氣中にて 30 分間加熱糊化して供與した。其の結果は第 3 圖の如くである。此の事實は有山⁽⁶⁾、山本⁽⁷⁾、松岡⁽⁸⁾の諸氏の實驗に於て認められた現象と一致して居る。但し No. 67 は 21 日目頃より體重曲線には變化を認めないが、毛並が著しく粗硬となり、脂漏の如き外觀を呈した。然るに其のまま約 2 週間飼育したるに漸次恢復した。

第 3 圖 牛乳の効力試験 (第 2 回) (昭和 11 年 11 月 25 日~12 月 30 日)



豫防試験區の No. 70 は 20 日目に斃死したが、死因は本試験の問題と別個のものとする。其の他は缺乏試験區よりも遙かに良き健康状態にして、牛乳には乾物として乾燥酵母の約 1/3~1/4 の有効成分が存在することを確認し得るのである。

缺乏試験區は何れも 3~5 日間に生長を停止し、20 日以内に大部分斃死した。又生存するものと雖も殆んど體重を増すことなく、極めて貧弱な外觀を呈し屢々出血を認める。

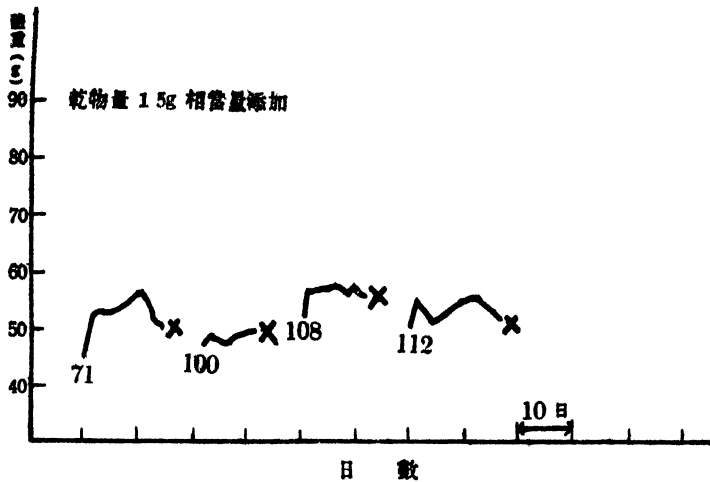
4. 加熱牛乳の効力試験

牛乳の効力が加熱により減ずるや否やを確める爲に先づ生牛乳 (pH=6.9) を取り、之を攪拌しつつ直下火を以て 30 分間に 96~98° に達せしめ、其の儘 30 分間保ちたる後冷却し、次に前項の滓乳濃縮物調製法と同様に處理して加熱滓乳濃縮物を造り、基本飼料に添加して豫防試験を行ふ。その経過は第 4 圖の如くである。

考 察

試験動物は 20 日間に斃死し、其の経過及状態は大略缺乏試験と同様である。故に該有効成分は牛乳を約 100° に 30 分間加熱するとき大部分破壊されるが如き結果となる。此の事實は一見有山氏の所見と相反する如くであるが、實際は加熱のときの pH 及其他溶存諸物質の有効成分に対する影響を無視されないのである。斯くの如きはビタミン類の例を見ても明らかな事實である。即ち牛乳の加熱に於ては斯くの如き結果を齎すと謂ふに止り、有効成分本體の性質に就ては今後の研究を待つものとする。

第4圖 加熱牛乳の効力試験 (昭和11年11月25日~昭和12年1月8日)



5. 牛乳有効成分の吸着試験

生牛乳及搾乳濃縮物より醋酸酸性にて酸性白土を用ひ吸着試験を行ひ、吸着酸性白土及其の残渣に就て効力を試験した。

「吸着性白」の調製は全てビタミン B₂ 試験の場合と同様の方法により調製し、之を吸着白土(1)とする。吸着残渣は醋酸酸性のまま精製炭酸瓦斯を通じて減壓低溫で濃縮し、茲に生ずる沈澱を吸濾して分ける。濾液を更に濃縮して乾固し、兩者を合して鹽化石灰真空乾燥器に入れて乾燥後、粉碎し更に空氣中に置いて醋酸を揮散せしめる。茲に白色結晶性の粉末を得て之を吸着残渣(1)とする。

又更に濃厚なる有効成分を得んとして先づ生牛乳より稀硫酸を加へて蛋白質を除き、其の搾乳に石灰水を加へて中和して硫酸石灰を濾去し、之を減壓濃縮して約 1/3 容となす。此の際に生ずる沈澱を吸引濾去して黄綠色粒稠なる濾液を得る。此の濾液に於て吸着白土(1)の場合と同様に處理して吸着白土(2)、及吸着残渣(2)を得る。但し此の場合は酸性白土は其の 0.1g が牛乳乾物の 1.5g に相當する量を用ひる。

各供試吸着白土、吸着残渣を基本飼料(牛乳効力試験第2回参照)に牛乳乾物1.5g相當量を添加して實驗を行ひ其の經過は第5圖の如くてある。

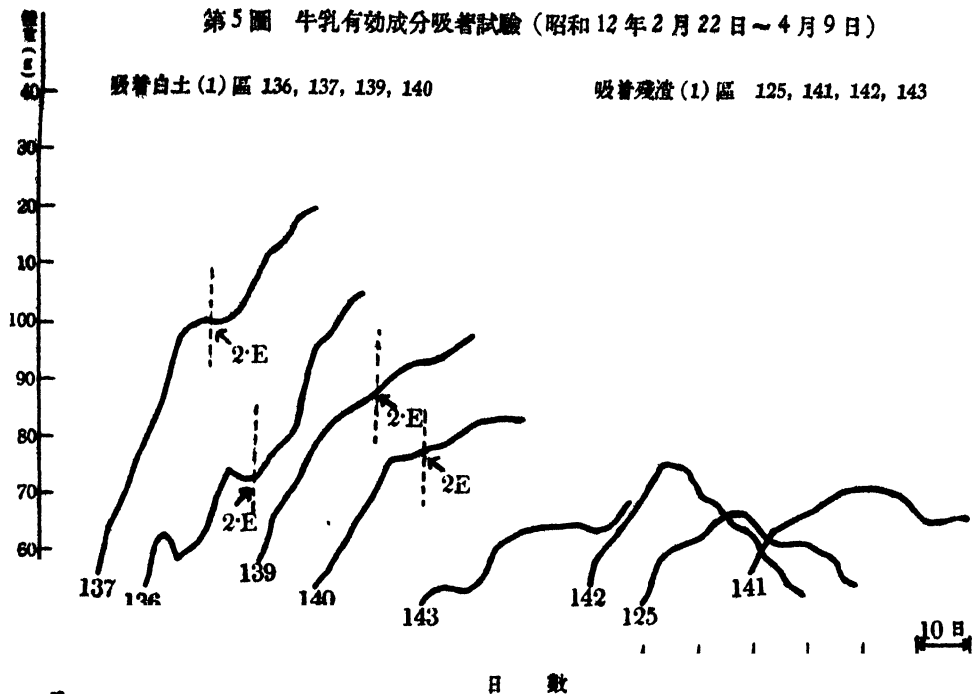
考 察

吸着白土(1)は牛乳乾物 1.5g 相當量を白鼠に供與する場合に其の發育をよく持續するか、其の 2 倍量と與へれば更によく、No 136 の如きは 40 日間に 54g より 119g 迄發育した。故に有効成分は pH=3.0 の醋酸酸性に於て酸性白土に吸着されることが明らかに認められる。

吸着白土(2)と與へたるものは其の効力の少いことを示してゐる。但し吸着残渣(2)と比較すれば明らかに有効成分の吸着されてゐることが認められる程度であるか、吸着白土(1)に較ぶれば著しく劣り其の効力は約 1/3~1/4 と思はれる。

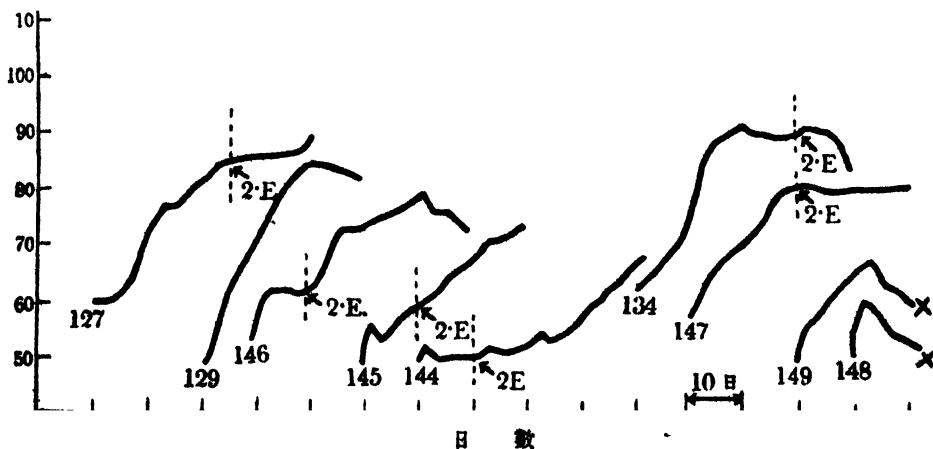
この原因に就ては、原料牛乳有効成分含有量の多少、實驗室に違ふ迄の經過、又は濃縮操作による破壊等が考へられるが、前項加熱試験、及吸着白土(1)の結果と對照して該有効成分は牛乳の状態にては熱に對して極めて不安定であるとするのが至當と考へる。

第 5 圖 牛乳有効成分吸着試験 (昭和 12 年 2 月 22 日 ~ 4 月 9 日)



吸着白土 (2) 區 127, 129, 144, 145, 146

吸着残渣 (2) 區 134, 147, 148, 149



吸着残渣 (1) 及 (2) 添加區は何れも 15~20 日間に明確に生長を停止し、既述の栄養障害症状を現し、其の後は殆んど生長せず僅かに體重を維持する程度である。故に有効成分は醋酸酸性で殆んど全部が酸性白土に吸着されるものと認める。

此處に著者等の注意を惹いた事實は、No. 134, 147 (第 5 圖参照) 及缺乏試験區の No. 109 (第 3 圖参照) の生長曲線に於て何れも 19~20 日目に的確な障害症状を認めたる後は全く生長せず、試験當初より體重約 30 を増加したのみで生長を停止したことである。著者等は此の白鼠に於て缺

乏症状の典型的なものを認めたと考へる。

6. 煉乳の效力試験

蔗糖は煉乳、又は粉乳に添加して乳児に多量に與へられることが多い。此の場合に蔗糖が栄養障害を惹き起すや、否やは人工哺乳料としての煉乳や粉乳に於ては極めて重要な問題である。依て本試験に於ては國産品に就き製造法又は製造後の期間を考慮することなく實際に店頭で販賣されるもの數種を集めて試験に供した。尚ほ個々の商品を批判する目的では無いから數種の商品を混合して供試品とした。

國産加糖煉乳 5 種及無糖煉乳 3 種を集め、各個より同量を取りて混合し、無糖煉乳の乾物に對する炭水化物量を加糖煉乳に於けるものと同等にする爲に從來の分析に基いて計算すれば次の如くなる即ち加糖煉乳の乾物量は 74.06

煉乳の組成（内務省衛生試験所分析）

% にして乾物に對する蔗糖量は

54.72% である。而して無糖煉

乳の乾物量は 25.70 % であるか

ら蔗糖煉乳 100 に 29 の蔗糖を

平 均 (%)	水 分	蛋 白 質	脂 肪	乳 糖	蔗 糖	灰 分
加 糖 煉 乳	25.94	9.22	8.95	13.41	40.53	1.95
無 糖 煉 乳	74.30	7.01	7.75	9.72	—	1.42

添加すれば加糖煉乳と同じ割合になる。而かも無糖煉乳は水分が多過ぎるから兩煉乳の比較試験に於て食下乾物量を同じくするには無糖煉乳 100g に蔗糖 29g を加へ、此の混合物を加糖煉乳の 1.8 倍與へることになる。本試験に於ては 4 區を設け無糖煉乳には蔗糖又は澱粉を補ひ、又次の如く乾燥酵母又はオリザニンを添加して比較試験を行つた。其の経過は第 6 圖の通りである。

第 1 區

蔗 糖 煉 乳

乾燥酵母 1 日 1 頭宛 0.5g

第 2 區

蔗 糖 煉 乳

ビタミン B₁ 1 日 1 頭宛 5g

第 3 區

無糖煉乳 + 局方白糖

同 左

第 4 區

蔗糖煉乳 + 局方馬鈴薯澱粉

同 左

但し第 4 區は腐敗し易いので毎日給與の都度之を配合し、蒸氣にて 30 分間加熱糊化して與へる。

考 察

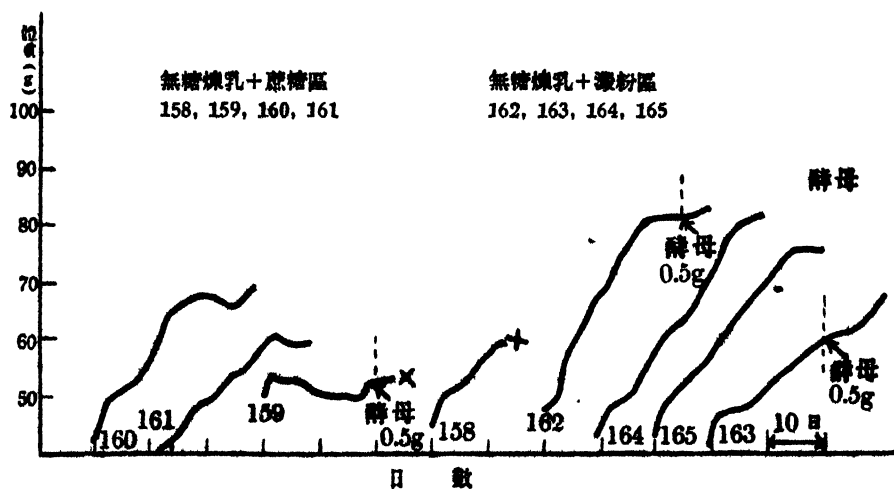
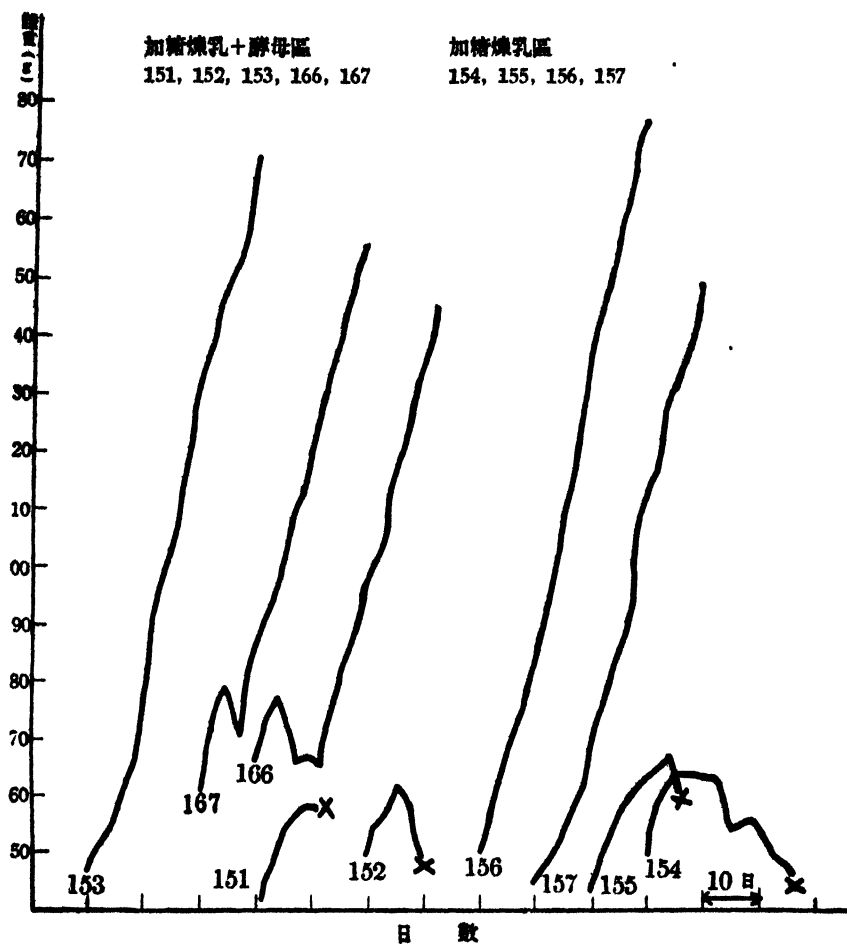
各區の動物は何れも試験開始後 2~5 日にして軟便又は下痢を起し特に加糖煉乳の場合に甚だしく、9 頭の内 4 頭は 10~20 日間に急激に體重を減じて斃死したが其の原因は本試験の目的とする要件とは別の關係に因ると認める。而して此の下痢より恢復したものは其の後の成長が極めて順調にして何等の栄養障害も起さず。又酵母添加區と無添加區は飼育 30 日間に大なる差異を認めない。即ち市販加糖煉乳はビタミン B₁ を補へば、特に蔗糖による栄養障害を認めず。飼育 30 日間は良好な發育を遂げたのである。

尚ほ酵母添加區と無添加區との間に大差ないこと及蔗糖 55% を與へたる場合の松岡氏⁽⁹⁾の實驗結果を參照すれば、加糖煉乳には有效成分が可成りの程度に含まれて居る事が明らかに認められる。

此の結果は前記加熱牛乳の效力試験の結果と一見矛盾するが如くであるが、實際は白鼠の 1 回平均 1 頭の加糖煉乳食下量が 15g にして牛乳乾物約 5g に相當するから、この程度の量には蔗糖煉乳製造工程中に破壊されずに残存する有效成分が可成りにあるものと考へられる。

乳糖に關しては、最近此れが過剰に飼料中に存在する場合の栄養障害⁽¹⁰⁾⁽¹¹⁾に就き研究報告されて居るが、本試験に於ては特に過量に入れなければならない様な事實を認めないので、考察の内に加へないことにする。

第 6 圖 煉乳の効力試験 (昭和 12 年 5 月 3 日 ~ 6 月 4 日)



無糖煉乳に炭水化物を添加せるものは最初軟便を認めたか、下痢に至らずして恢復した。然し其の後は澱粉添加区及蔗糖添加区共に發育極めて不良である。更に試験末期約 10 日間に乾燥酵母の 1 日 1 頭當 0.5g を與へたか、効果を認めない。此の原因は恐らく特殊成分の缺乏ではなく水分の過剰なるが爲に食量攝取の不足からであると考へる。

斯くの如き飼育條件により得た結果から蔗糖の影響を判断することは不確實を免れないか、著者等は無糖煉乳に就ては蔗糖は多少栄養障害を起すのではないかと推察するに止めて更に今後の研究を待つものとする。

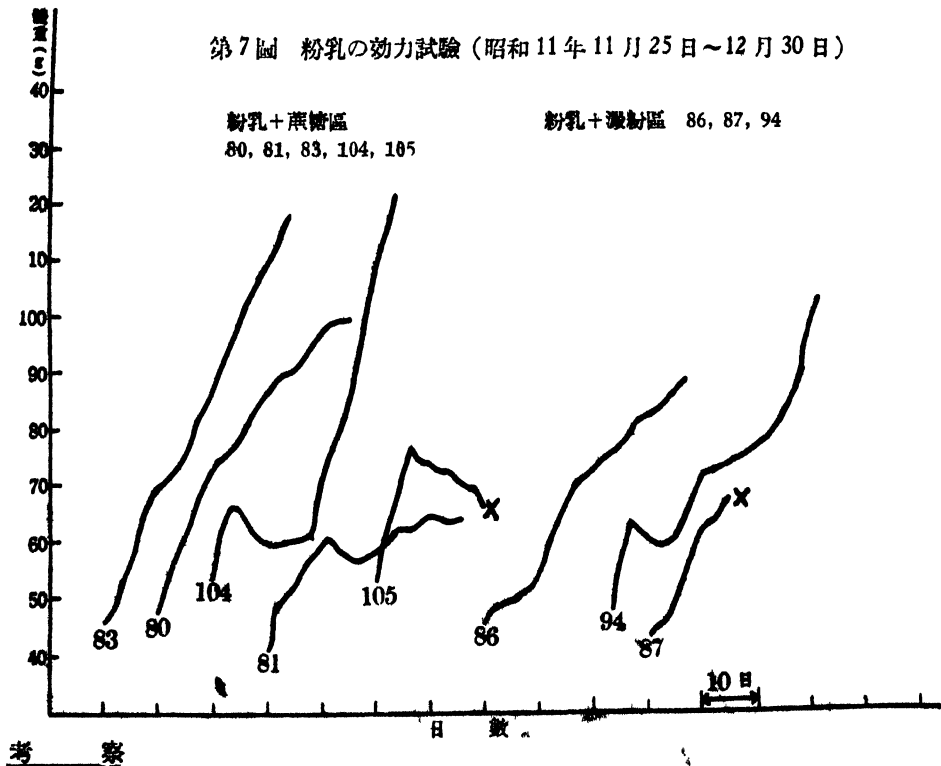
7. 粉乳の效力試験

噴霧式製造法による市販の無糖粉乳を本試験に用ひ、其の組成は貼付記載によれば水分 2.0%、脂肪 27.8%、蛋白質 27.2%、乳糖 37.5%、灰分 5.5% である。而して供試品に添加する蔗糖の量を恰も加糖煉乳に於ける乳糖に對する割合の 13/41 と近値となす爲に粉乳 100g に蔗糖 120g を添加すれば供試飼料の組成は次の如くなる。尙ほ比較の爲に蔗糖の代りに澱粉を添加する。

水分	脂肪	蛋白質	乳糖	灰分	蔗糖又は澱粉
0.9%	12.1%	12.0%	17.0%	2.1%	54.5%

試験區は蔗糖區と澱粉區との 2 區となし各區には別にビタミン B₁ として 1 日 1 頭當 5γ のオリザニンを補給する。動物試験の経過は

第 7 圖の通りである。



粉乳澱粉添加區は初め飼料を加熱糊化せず適量の水を加へたるのみにて、攪拌して與へたるに前記の場合と同様に膨軟な黄白色の軟便を排泄し、體重を過減したので其の後は蒸氣にて 30 分間加

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noticed)

The Determination of Carbonic Acid Contained in Solid Substances.

(pp. 135~139)

By Yosaburo IWASA and Kunitaro IWAMOTO.

(Dept. of Food Chemistry Osaka Municipal Hyg. Lab. Received Nov. 18, 1937.)

(1) The authors have perfected a method on the determination of carbonic acid contained in solid substances, improving on the method designed by Pettenkofer. Namely, we have improved an air-collected bottle, together with the methods and etc. involved in the determination of carbonic acid in air.

(2) The results obtained in experiments using this new method were good. In separating 45.2638 mg of CO_2 from 75.5 mg of CaCO_3 , the result measured inside the error of 0.3 mg.

(3) These designed experiments were repeated 10 times, using about 5 mg, 10 mg, 100 mg of CaCO_3 and the standard deviation was determined.

(4) The gravimetric determination of carbonic acid by Fresenius-Classsen method was repeated 10 times using, also, 5 mg, 10 mg, 100 mg of CaCO_3 and the standard deviation was measured.

(5) After comparing the results obtained in the two above mentioned experiments, we inferred that our designed method was better than that of Fresenius-Classsen and that the results were perfectly satisfactory.

Studies on Ascorbic Acid Oxidase. I.

(pp. 140~148)

By Nobuo Ito.

(From the Agr. Chemical Laboratory, Hokkaido Imp. Univ.,
Sapporo, Japan. Received Nov. 18, 1937.)

27 species of vegetables and fruits were examined concerning the existence

of ascorbic acid oxidase in the 30% alcohol extracts. Carrot, potato, burdock, squash, cucumber, muskmelon, oriental pickling melon, Japanese melon (makuwauri), soy-bean, azuki-bean, cow-pea, egg-plant, pear, loquat and cabbage were powerful on the enzymic activity; sweet potato, water-melon and Japanese apricot were weak, while radish, turnip, pumpkin, onion, pea, cherry, grape, and gooseberry were negative. The occurrence of the enzyme is not correlated to the amount of ascorbic acid in the same plant and the reason for such distribution of the enzyme is incomprehensible from the taxonomical or ecological point of view.

From the fact that onion, welsh onion and radish were negative on the enzymic function, the author supposed the relation of the enzymic oxidation to the sulphur compounds, especially to allyl sulphide, which are contained in these vegetables. The juice from onion, however, did not inhibit at all the enzymic oxidation of ascorbic acid in the reaction mixture containing the alcohol extract of potato or the enzyme preparation from cucumber, but the oxidation by copper a little. This result does not agree with author's supposition and the further investigations on the behaviour of allyl sulphide and the other sulphur compounds in higher concentration are remained in future.

The inhibitory effect of metaphosphoric acid or oxalic acid on the enzymic oxidation of ascorbic acid was compared and shown that oxalic acid was more effective, then it will be possible to use the acid for the extraction and the estimation of ascorbic acid.

The oxidation of ascorbic acid was accelerated by Cu + gelatin or Cu + ovoalbumin, but not by Cu + peptone. The former mixtures lost the action by heating, as Stotz and the co-workers reported recently. The optimum pH of Cu + gelatin for the action was pH 4.1~4.8, Cu + ovoalbumin pH 4.8, while that of the enzyme preparation from cucumber was pH 6.0. Moreover, it was noticed that the intensity of the oxidation by the mixture of copper and protein was generally weaker than the enzyme. The problem whether the "ascorbic acid oxidase" is a mixture of copper and albumin or not, should be studied further, and this solution will give a suggestion for the chemistry of the nature of all enzymes.

Alcohol Manufacture from Potato. (Part IV).

On the Preparing of Alcohol-mash by the Method of
Acid-hydrolysis of Potato. (II).

(pp. 149~158)

H. OKADA, S. KASHIWABARA, and T. SUGIYAMA.

(The Hokkaido Industrial Experiment Station, Received Oct 28, 1937)

In this paper experiments are described concerning the saccharification of the dried potato pulp using sulphuric acid. It is prepared from potato by rotatory kiln-dryer after the removal of 40% of potatoes as juice by pressing. The moisture

content of the dried potato pulp is reduced to 11.18%. As a result of our works it is shown that the dried potato pulp requires a smaller amount of acid for the saccharification than the crushed non-pressed potato but a larger amount of acid than the pressed non-dried potato. The experimental results were summarized as follows :

(1) The reducing substance is, at best, obtainable with a yield of about 90 % of the starch after 3 hours at 4 atm. pressure using sulfuric acid (sp. gr., 1.84) 0.6% by weight on the dried potato pulp, (the acid amount corresponds to about 3.5% on the starch contained), which is added with treble amounts of water. At a lower pressure 3.0 atm. the yield of the reducing substance is, similarly as before, equivalent to about 90% of the starch after 3 hr.-saccharification even using an increased amount of the acid 0.75% on the material to be saccharified (about 4.6 % sulfuric acid on the starch). In these cases, that is to say, the conditions for the saccharification such as the amounts of the acid used and the pressure supplied are probably deficient. At an increased pressure 3.5 atm. using 0.75% sulfuric acid on the material it is possible to obtain 81.6% reducing substance after 1 hr.-saccharification and 98.0% or more after 2 hours. It may, therefore, be sure to obtain a sufficient saccharification within 1 hour using a little more acid.

(2) Practically it is somewhat trouble to saccharify the pulp which is prepared from the dried potato pulp by pressing it after steeping in 1.5 or 2.0 times amounts of water for some hours. But according to the procedure mentioned above, it is found possible that the consumption of the acid is only greatly saved, but also the velocity of the saccharification is remarkably accelerated.

(3) Attempt is made to prepare a highly concentrated sugar containing solution either from the raw pressed potato or from the dried potato pulp. And it is confirmed possible to obtain an about 25 or 35% reducing substance containing solution from both materials with a yield of 99% after 1 or 1.5 hr.-saccharification. In these case, the acid-supplies are equivalent to 3.46% on the starch in the non-dried potato pulp and 4.32% on that in the dried potato pulp at the same pressure 3.5 atm. The above described process facilitates remarkably the saccharification and renders the pressed juice in the pulp preparation available to the fermentation.

(4) A few volatile substances are qualitatively examined which are found in the saccharified solutions either of the raw potato pulp or of the dried potato pulp using sulfuric or hydrochloric acid. Furfurol, glyoxylic acid, levulinic acid and formic acid can be detected. Then, furfurol and formic acid are examined in respect to their effects on the fermentation of the Hayduck-solution (glucose) by Kasse XII, as they are thought the most harmful among them. As a result of our investigations it can be stated with certainty that amounts of these substances, which are produced in our saccharification process, are too small to give harmful effects on the fermentation.

Sterilizing Action of Acids. Xith. Report.

The total summary and the total conclusion on the sterilizing action of mineral acids and fatty acids.

(pp. 159~164)

By Sogo TETSUMOTO.

(The Government Institute for Infectious Diseases, Tokyo
Imperial University. Received Nov. 5, 1937.)

By the systematic studying of mineral acids and fatty acids and their salts on the physiology of bacteria, we obtain the next conclusion.

I. The influence of mineral acids on bacterial physiology is as follows.

(1) The original cause of the sterilizing action of strong mineral acids is the reducing action by dissociated H ion of acids, and then if the pH of acids are the same, then the sterilizing action is quite equal notwithstanding the difference of kind of acids.

(2) Concerning the sterilizing action of the weak mineral acids, we see two types:—

i) The cause of the sterilizing action of cyanic acid, boric acid and very dilute solution of osmic acid is due to the toxic action for bacterial protoplasm.

ii) The cause of the sterilizing action of osmic acid and chromic acid is due to the oxidizing action of their acid anions on the bacterial protoplasm.

II. The influence of fatty acids on bacterial physiology is very complex.

(1) We see special relation between the number of C atom of fatty acids and the sterilizing or promoting action on bacteria.

When the number of C atom is within 6~8, the sterilizing action of each fatty acid, is chiefly due to the reducing action by pH, and then when the number of C atom is 8~11, the sterilizing action of each acid is chiefly due to the poisoning action of undissociated molecule of each acid to bacterial body.

Each acid of $C_{14} \sim C_{18}$ has no bactericidal or bacteristatic action, but has rather promoting action for the life of microorganisms.

(2) When halogen atoms, aldehyde group, or carbonyl groups combine to alkyl groups respectively, then the poisoning action or reducing action of acids increases. Accordingly, the sterilizing action of fatty acids increase.

(3) There seems inverse relation lies between the number of CO_2H group and the strength of sterilizing power of fatty acids.

(4) We see no relation between the number of (OH) group and the strength of sterilizing action.

(5) We find the special relation between the chemical constitution of fatty acids and physiology of bacteria.

i) Normal fatty acids have the stronger sterilizing action than isomers.

ii) Cis fatty acids have the stronger bactericidal or bacteristatic action than trans fatty acids, and trans fatty acids have the stronger promoting action than cis fatty acids.

Such difference are due to difference in the stereochemical constitution of these fatty acids.

Namely, in the case of dibasic fatty acids, *cis* fatty acids have CO_2H group or H atom at the same side in their stereochemical constitution. Dissociated H ions of *cis* fatty acids are absorbed more and have the stronger reducing action on the bacterial protoplasm than *trans* acids.

Accordingly, *cis* dibasic fatty acids have the stronger sterilizing action than *trans* fatty acids, and *cis* monobasic fatty acids have CO_2H group or H ion at the same side as already mentioned in the case of dibasic fatty acids.

Owing to this, *cis* acids have the greater dissociation degree and are absorbed more on the bacterial protoplasm than *trans* fatty acids.

Accordingly, *trans* fatty acids exist mostly in a harmless molecular state for the bacterial physiology and also have the action to prevent the great change of osmotic pressure of bacterial body. In the preventing action on the change of osmotic pressure in the bacterial protoplasm, *trans* fatty acids are superior to *cis* fatty acids.

iii) Judging from the effects of the three kinds of optically active fatty acids, such as lactic acids, malic acids and tartaric acids, on the physiology of bacteria, we could ascertain that optically active fatty acids having the stereochemical constitution, show not only optically active property, but also the stronger action on the physiology of bacteria than optically inactive fatty acids. Optically active fatty acid salts have the more promoting action for the bacterial life than optically inactive fatty acid salts. *d* and *l* optically active fatty acid salts have the same promoting action on the bacterial life and their action is stronger than that of *r* and *m* acid salts. Salts of *r* and *m* acid isomers have the nearly equal promoting action.

In short, lactic acid, malic acid and tartaric acids having optically active property, have not only the specific rotatory action physically but also the stronger bactericidal action or promoting action on the bacterial life.

On the Method of Determination of pH of Soil under Natural Field Condition.

(pp. 165~177)

By M. AOKI.

(Kyoto Imperial University. Received Nov. 18, 1937.)

In order to compare the accuracy of the method of pH determination of soil under natural field condition, the present author conducted pH determination of 28 soils by the so-called field method (A-type) by H. J. Verweil and by the new electrode (B-type) devised by Dr. A. Itano and compared the results with those of usual Quinhydrone method.

The results are summarized as follows :-

(1) pH value of soil suspension determined by B-type electrode was usually a little higher or lower than that by usual Quinhydrone method, but sometimes a marked difference was obtained on some soils.

(2) For the most soils studied, a remarkable change in E. M. F. was observed within 2 minutes after the insertion of electrode into soil or soil suspension.

(3) It was found that there was no regular relation between pH value and moisture content of soil.

(4) Greater variation of pH value of soil within small area (15 cm dia.) was obtained by Itano's electrode (B-type) than that by usual Quinhydrone method.

On the Fixation of Sericin of Raw Silk. (Part II).

Fixation of sericin powder by chromium salts.

(pp. 178~186)

By Masami OKU and Zirô HIROSE.

(From the Chemical Laboratory of Gunze Raw Silk Mfg. Co. Ltd.,
Ayabe-mati, Kyôto-hu; Received December 20, 1937.)

In this paper we studied the fixation of α - and β -sericin powder, which were prepared from the raw cocoon layers, by treating with basic chromium sulphate (which has cationic chromium complex) and basic oxalato-chromiate (which has anionic chromium complex) respectively. Thus the modes of adsorption of chromium and sulphate ions, as the results of which caused the increase of water stability of sericin, were studied precisely. But in this and later reports we mean α -sericin by one which can be obtained as precipitates when making pH of the sericin sol 3.8 and β -sericin by one which can be obtained as precipitates from the filtrate of α -sericin by increasing the conc. of alcohol up to 50%, adding ethyl alcohol to the filtrate.

The experimental results were summarised as follows;

1) Combination of sericin (α -, β -) with Cr_2O_3 and SO_4 respectively occur as true adsorption phenomenon, following the formula of Freundlich's adsorption isotherm.

2) β -sericin takes up more Cr_2O_3 and minor SO_4 than α -sericin when treated in the basic chromium sulphate bath of the same concentration which has cationic chromium complexes. In the case of basic oxalatochromiate bath which contains anionic chromium complexes α -sericin takes up more anionic chromium and minor SO_4 than β -sericin. We can therefore conclude that α -sericin takes up more anions and minor cations than β -sericin.

3) α -sericin becomes much more water stable than β -sericin when treated with basic chromium salts, but keeping in mind the higher water stability of the original α -sericin, degree of fixation of β -sericin is much more facilitated than α -sericin through chromination.

4) Fixation of sericin by treatment with chromate complexes is much more effective than that by chromiate complexes.

5) Sericin isolated from the the cocoon layers adsorbs minor amount of chromium and sulphate than that which is retained on the same raw silk fibres. Even when the amount of chromium taken up by sericin is the same, water insolubility of the powdered chrome-sericinate is always smaller than in the case of native sericin on the fibres. Perhaps, there may exist some differences of mode of chromium-sericin combination between both cases.

Studies on Micro-methods for the Chemical Analysis of Water. III.

A new portable colorimeter.

(pp. 187~197)

By Tetuo TOMIYAMA and Minoru WATANABE.

(The Imperial Fisheries Institute, Tokio. Received Oct. 21, 1937.)

Descriptions have been made on a new simple portable colorimeter. The following points may be mentioned as its characteristics: (1) only 40 cc sample is needed for estimations, (2) having two sets of colorimeter tube, each consisting of a pair of an outer and an inner tube, it is easy to eliminate the difficulty met by inherent color or turbidity of the sample water, (3) the two sets of colorimeter tube do not run parallel but a little inclined so that the color comparison may be made by one sight, (4) pH determination can be carried out by Gillespie method, (5) adopting Martiny's procedure all colorimetric methods may be carried out without using distilled water. In the field works, accordingly, the colorimeter is very convenient to carry out the colorimetric analysis. The accuracy of the procedure has been studied in detail.

Composition of Jerusalem Artichokes and its Inulase.

(pp. 198~209)

By Toshinobu ASAI.

(Agricultural Chemical Laboratory, Morioka Agricultural College, Japan. Received Nov. 4, 1937.)

Action of a Green Fluorescent Substance Like Acetyl Flavins on Plants and Animals. (Part I).

(pp. 210~213)

By Tetutarō TADOKORO and Tuneyuki SAITO.

(Hokkaido Imperial University, Japan. Received Nov. 4, 1937.)

On the Contents of 0.2N HCl Soluble Phosphoric Acid of Työsen Soils (IV).

(pp. 214~225)

By Dr. Misu HIDEO.

(Chemical Department, Agricultural Experiment Station of Government General of Työsen. Received Nov. 10, 1937.)

Effects of Some Substances in the Extracts of Rice Polishings and Beef Liver on Pellagra-like Symptoms of Rats due to High-Sucrose Diet.

(pp. 226~235)

By Ume TANGE.

(The Institute of Physical and Chemical Research. Received August 13, 1937.)

PART I.

In the study of the vitamin B₃ complex, the carbohydrate constituent of the basal ration has received much attention. Bender et al. demonstrated protection from dermatitis and increased growth with dextrin rather than sucrose in the diet. Chick and coworkers reported a more regular incidence of dermatitis when maize sugar replaced starch.

For comparative studies concerning the effects of some substances in the extracts of rice polishings and beef liver upon the dermatitis of rats caused by a dietary deficiency, the lack of vitamin B₃ named by György, sucrose and dextrin were used as the carbohydrate source of the basal ration, which consisted of:

A. Sucrose ration.

Purified fish protein	18%
Sucrose (pharmacopeia Japonica)	64%
Crisco	3%
McCollum salt	5%
Agar-agar	2%
Dried egg white (as flavin)	8%

B. Dextrin ration.

Purified fish protein	18%
Dextrin (potato or corn starch)	66%
Crisco	3%
McCollum salt	5%
Dried egg white (as flavin)	8%

Each group of A and B rations was daily supplemented with 10γ of crystalline vitamin B₃ and one drop of cod liver oil (pharmacopeia Japonica).

Preparation of antidermatitic factor from rice polishings—Oryzanin extract* was used as the starting material, and extracted carefully with 85~88% alcohol

* Thick syrup of rice polishings extract prepared in Sankyo Company, Tokyo.

several times to remove sugar contained in the extract. The alcohol extracts were evaporated to expel off the alcohol, added water, acidified with sulphuric acid to pH 2.5, and then treated with acid clay in the usual manner.

The acid earth adsorbate and its eluate, which eluted with either $\text{Ba}(\text{OH})_2$ or NaOH , each supplementing sucrose diet at the level equal to 1 g of oryzanin extract were tested on the rats.

Concentration of beef liver extract—The beef liver powder, which dried at about 70°C and extracted with ether, was digested with papain. After separating the papain solution from residue, the latter was extracted thoroughly with 80~90% alcohol, and the alcohol extracts were evaporated in vacuo. This was then combined with the papain solution, and concentrated under reduced pressure to a convenient volume (Fraction A). It was now acidified with conc. hydrochloric acid to pH 2, and then treated with acid clay as above. The filtrates from acid earth adsorbates were neutralized with NaOH , added 90% alcohol, and NaCl and inert material were allowed to settle out. After removing the precipitates, the solution was concentrated in vacuo so that 1 cc equal to 1 g of the original beef liver powder.

The experimental results are summarized as follows:

1. A high incidence of dermatitis in rats when using sucrose rather than using dextrin in diet was observed.
2. The pellagra-like symptoms of rats were protected and cured with acid clay adsorbate as well as its eluate of rice polishings extracts, at the level equivalent to 1 g of oryzanin extract.
3. The properties of the antidermatitic factor in rice polishings extracts resembled those of B_6 described by György, namely the active substance was not precipitated by lead acetate, but precipitated from acid solution by phosphotungstic acid, etc.
4. Rats receiving vitamin B_6 , flavin and vitamin B_{12} (antidermatitic factor in rice polishings extracts) did not attain normal growth though no dermatitic symptoms appeared.
5. In the above case, if B_6 was replaced by the liver filtrate the rats were growing for some periods in spite of developing dermatitic symptoms, probably due to the lack of B_{12} . There was in every case a better growth when the earth adsorbate of rice polishings extracts and liver filtrate were fed in combination.

PART II.

The phenomena described in 4 and 5 of the summary mentioned above, called the author's attention to determine the properties of liver extract.

As the preliminary work on the liver growth factor the following the following procedure was used:

a. Concentration of the factor from liver extract—Fraction A of liver extract was diluted with water, and a mixture of alcohol and ether was added with con-

stant stirring. The precipitate was allowed to settle out and the supernatant liquid decanted. The precipitate was dissolved in water and reprecipitated. After being washed with an alcohol-ether mixture the precipitate was dissolved in water and allowed to stand in the ice box. Removing the inert matter, the combined filtrate and washings were concentrated in vacuo.

b. The basal ration consisting of: Purified fish protein 17, dextrinized corn starch 54, McCollum salt 4, Crisco 5, white corn 15, and dried egg white (as flavin) 5 was used as this ration has been found to furnish all the known vitamin B complex when supplied with vitamin B₁. Besides one drop of cod liver oil was administered daily.

The experimental results are as follows:

The rats given the diet supplemented with vitamin B₁ failed to grow without developing any type of lesions, but those administered daily with 0.5 cc of alcohol-ether precipitate equal to 1 g of Fraction A showed rapid growth.

By adding 5% Fraction A to the basal diet, an excellent growth response was resulted.

(Further studies of the growth factor is in progress).

Feeding Experiments with Decomposition Products of Proteins. (V).

On the nutritive Value of some Protein Derivatives and
partial Decomposition Products.

(pp. 236~241)

By Siro MAEDA.

(The Institute of Physical and Chemical Research,

Received May 28, 1937.)

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noticed)

On the Fermentative Degumming of Waste Silk. Part IV.

Enzymic action of Degumming Bacteria (*Bacillus cereus* sp.)
upon Sericin and Fibroin.

(pp. 243~247)

By Hideo KATAGIRI and Toshio NAKAHAMA.

(Agr. Chemical Laboratory, Kyoto Imperial University and Kanebo

Silk Factory: Received Dec. 17, 1937.)

The active centre of *Bacillus cereus* was concluded to be the soluble enzyme named "degummase", since the clear filtrate of the bacterial cultures revealed powerful degumming of silk in the presence of toluene.

Several external conditions on the action of degummase was tested; optimum pH value was found to be 7.0~8.0 and optimum temperature was 40°C. The enzyme was sensitive to acid media, while it was rather stable to high temperature, since degummase was inactivated when it was kept at 65° for 2 hours.

Any noticeable decomposition of fibroin was not observed by the enzyme, although sericin A and B were attacked by degummase with very much the same rate.

Studies on Soya-been Oil-foots, (2)

Isolation of free Amino Acids

[Arginin, Aspartic-, Glutamic-, oxyglutamic Acid and etc.]

(pp. 248~250)

By Kozi OKANO and Iwao BEPPU.

(The Central Laboratory of the South Manchuria Railway Co., Received Dec. 21, 1937.)

We reported in the previous paper the composition of soya-bean oil-foots and two chief components which were stachyose and organic complex. In the present investi-

gation we are able to isolate several kinds of free amino acids from the crude stachyose fraction. Namely the water solution of oil-foots is added with alcohol to bring about the concentration of alcohol at about 60%. At that conc. stachyose remains in solution and an organic complex settles down. Then the alcohol of the filtrate is evaporated off and is added successively with Pb-acetate and Hg-acetate at slightly alkaline and the precipitates at each time are separated off. So the latter is due to some amino acids, the ppt. is treated with H_2S to remove Hg and the filtrate is added with phosphotungstic acid. The ppt. thus formed is decomposed with $Ba(OH)_2$ after the ordinary method and arginine is obtained from this fraction. The filtrate from the ppt. is added with $AgNO_3$ and $Ba(OH)_2$ and the ppt. thus formed is decomposed with H_2S . Then glutamic acid is obtained as its HCl-salt, aspartic acid as its Pb-salt and oxyglutamic acid as its Ag-salt successively. From the filt. of above three amino acids an acid is obtained as free crystalline state. This amino acid is lactone and melts at $245^\circ C$ and its analytical formula is $C_7H_{10}O_7N_2$. By the Van Slyke's method for amino nitrogen two atoms of nitrogen are liberated and by the titration at hot diluted alkaline solution and by the formal titration method two carboxyl radicals are proved. The ninhydrin and biurett reaction are given.

On Acid-Soil of Peculiar Behavior. (V)

(pp. 251~262)

By S. OSUGI and M. AOKI.

(Kyoto Imperial University. Received Dec. 14, 1937.)

1. The authors have already reported that formic, acetic and oxalic acids have been isolated in a distinct quantity from the acid-soil of peculiar behavior. Now, the result of investigation on the effect of these acids to the peculiarity of soil, shows that both of acetic and oxalic acid has a marked positive effect on this property and that formic acid shows nothing.

2. It was also experimented that for the most part of iron dissolved from the soil in paddy field condition, comes from ferric hydroxide, magnetite and ferric phosphate in the soil.

3. After standing the soil with dilute hydrochloric acid solution or with potassium chloride solution with HCl or KOH, ferrous iron and pH in the extract were determined.

By plotting the quantity of iron dissolved against pH, the authors obtained the curves which show that at every same pH value, KCl extracts more iron than HCl.

The above result shows that some part of iron dissolved, comes from the iron adsorbed by soil.

**Chemische Untersuchung über die Bestandteile
der Rosskastaniensamen. II Mitteil.**

(ss. 263~272)

Von R. SASAKI und M. KANDATSU.

(Aus der Agrikulturchem. Institut d. Univers. Tokyo. Eingeg. am 17. Januar, 1938.)

**Vitamin A Potency and Fatty Substances of
Sukesodara and Aburatsunozeame Eggs.**

(pp. 273~276)

By Masanobu YOSIDA.

(Kawai Institute, Tokyo. Received Dec. 27, 1937.)

**The Relation of the Composition of Liver Oil Fatty
Acids to the Fishing Season of the Cod.**

(pp. 277~283)

By Masanobu YOSIDA.

(Kawai Institute, Tokyo. Received Dec. 27, 1937.)

The cod liver oil having powerful vitamin A prepared in the spawning season and immediately thereafter, when the oil content of liver is most decreased, tends to be lower in the highly unsaturated acid content than that of feeble vitamin A potency rendered prior to spawning. As regards saturated acids no definite difference is recognized.

The liver oil of specially high vitamin A potency from the typical cod liver in spawning season, compared with the average one, contains greater amount of highly unsaturated acids, but smaller amount of saturated acids.

In "Ishinagi" liver oil, the same relation is also found.

The highly unsaturated fatty acid content in the depot fat of liver oil-fed rats decreases rapidly during fasting.

**On the Correlation of the Organic and the Mineral
Matters contained in Malberry Leaves. (2) -**

(pp. 284~288)

By K. KATO and S. NAGI.

(The Sericultural Experiment Institute of Gifu Prefecture. Received Dec. 27, 1937.)

The writers have studied on the correlation of the organic and the mineral matters contained in malberry leaves, and reported following results. The quantity of K_2O ,

P_2O_5 are correlated to the quantities of the raw protein and Na_2O to the soluble carbohydrate in sp. gr. 1:15 HCl, and the correlation co-efficient and probable error of correlation coefficient are as follows:

- | | | | |
|-----|----------------------------------|---------------|----------------|
| (a) | Between raw protein and P_2O_5 | $\gamma=0.67$ | $E\gamma=0.09$ |
| (b) | Between raw protein and K_2O | $\gamma=0.75$ | $E\gamma=0.06$ |
| (c) | Soluble carbohydrate and Na_2O | $\gamma=0.82$ | $E\gamma=0.04$ |

From these correlations, the writers considered it was interesting to ascertain that carbohydrate or raw protein in malberry leaves were increased or not when P_2O_5 , K_2O or Na_2O are manured in malberry-tree yard.

At the results of experiment, carbohydrate in malberry leaves is not increased when Na_2O (which is correlated to carbohydrate) is manured in soil, and on the contrary raw protein is increased. Protein is increased when P_2O_5 or K_2O are manured in soil respectively.

On the Contents of 0.2 N HCl Soluble Phosphoric Acid of Tyôsen Soils. (V)

(pp. 289~300)

By Dr. MISU-Hideo.

(Chemical Department, Agricultural Experiment Station of Government General of Tyôsen. Received Nov. 24, 1937.)

Chemical Studies of Green Tea. 2.

On the Saponin of Green Tea (1).

(pp. 301~308)

By Saichi MACHIDA.

(Chemical Laboratory, Tokyo Agricultural College. Received Nov. 15, 1937.)

On the Fixation of Sericin of Raw Silk (Part III).

Deamination of sericin and fixation of deaminized sericin by chromium salts.

(pp. 309~317)

By Masami OKU and Zirô HIROSE.

(From the Chemical Laboratory of Gunze Raw Silk Mfg. Co. Ltd., Ayabe-machi, Kyôto-hu. Received Dec. 20, 1937.)

As the theories of fixation of sericin can be interpreted as an inactivation of its hydrophilic groups, it may easily be supposed that sericin can be altered into a water stable state if its hydrophilic groups are inactivated. Thus, sericin may

become even more insoluble against boiling water by further treatment with chromium salts.

In this report we have studied some influences of deaminization of sericin upon its fixation by chromium salts.

The experimental results were summarised as follows.

- 1) Raw silk becomes more insoluble against boiling water by deaminization.
- 2) Adsorption of Cr_2O_3 and SO_4 through deaminized raw silk occurs according to the formula of Freundlich's adsorption isotherm and its adsorption amount decreases as compared with that of nondeaminized sericin.
- 3) Deaminized raw silk which is treated with chromium salts shows much more water stable than that merely chromed without deaminization.
- 4) Loss on deaminization and degree of nitrogen decrease of β -sericin are greater than those of α -sericin.
- 5) With exception of β -sericin with Cr_2O_3 , combination of Cr_2O_3 and SO_4 with α - and β -sericin follow the formula of Freundlich's adsorption isotherm.
- 6) Both deaminized α - and β -sericin show smaller quantities of adsorption with Cr_2O_3 and SO_4 than those which are non-deaminized.
- 7) Deaminized β -sericin adsorbs more Cr_2O_3 and less SO_4 than deaminized α -sericin as was already observed in the case of non-deaminized sericin.
- 8) Fixation degree of deaminized α -chrome-sericinate becomes much more remarkable than those of deaminized β -chrome-sericinate but its effect due to chromination is greater in the case of deaminized β -sericin.
- 9) Deaminized chrome-sericinate becomes much more water stable than chrome-sericinate.

Chemical Studies on Japanese Coccidae. XVII.

On the Resinous Substance of Ceroplastes rubens

Mask. IIII.—Rubeabietic acid.

(pp. 318~328)

By M. KAWANO and R. MARUYAMA.

(Laboratory of Ohsaka Factory of Sankyo Co., Ltd., Received Dec 6, 1937)

On the Contents of 0.2 N HCl Soluble Phosphoric acid of Tyôsen soils. (VI)

(pp. 329~341)

By Dr. MITSU-Hideo.

(Chemical Department, Agricultural Experiment Station of Government General of Tyôsen, Received Nov. 24, 1937.)

Zuckerrohrwachs. II Mitteil.

Oxydationsversuche mit Zuckerrohrsitosterin.

(ss. 342~348)

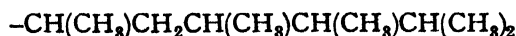
Von Tetuo MITUI.

(Aus d. Agrikulturchem. Laboratorium d. Kaiserl. Universität, Kyoto.
Eingegangen am 5. 1. 1938.)

Mit Hilfe des bekannten Oxydationsverfahrens¹⁾ mittels Chromsäure konnte ich aus Zuckerrohr-sitosterin drei wichtige Abkömmlinge gewinnen, nämlich trans-Dehydroandrosteron, 3-Oxy- Δ^6 -bisor-cholensäure und 3-Oxy- Δ^6 -ätiobiliensäure. Die Schmelzpunkte dieser drei Stoffe und ihrer Derivate sind:

	Schmelzpunkt (unkorr.) nach d. Verfasser aus Zuckerrohr- sitosterin)	Schmelzpunkt nach Literatur (aus Cholesterin u. Stigmasterin)
trans-Dehydroandrosteron	140~141°	140~141 ^{o1)}
-acetat	168~169°	171~172 ^{o1)}
-acetat-semicarbazon	271~272°	275 ^{o1)}
3-Oxy- Δ^6 -bisor-cholensäure	295°	295 ^{o2)}
-methylester	137°	138 ^{o2)}
-acetat	231~232°	235 ^{o2)}
-methylesteracetat	135°	137 ^{o2)}
3-Oxy- Δ^6 -ätiobiliensäure	247~248°	250 ^{o3)}
-dimethylester	109~110°	112 ^{o3)}
-dimethylesteracetat	150~151°	153 ^{o3)}

Auf Grund dieser Ergebnisse wurde festgestellt, dass Zuckerrohrsitosterin in seiner Konfiguration bis zur Kohlenstoffnummer 22 mit Cholesterin bzw. Stigmasterin identisch ist. Ausserdem möchte ich noch bemerken, dass Zuckerrohr-sitosterin, da es bei der Oxydation als primäres Abbauprodukt keine 3-Oxy- Δ^6 -nor-cholensäure, sondern nur 3-Oxy- Δ^6 -bisor-cholensäure ergibt, eine Seitenkette



besitzt.

On the Unsaponifiable Matter of the Algae Fats, IV.

On the lipase activation as influenced by Pelvesterol.

(pp. 349~351)

By K. SHIRAHAMA.

(Agr. Chemical Laboratory, Hokkaido Imperial University, Japan. Received Dec. 2, 1937.)

As compared with other sterols (cholesterol, phytosterol, ergosterol and taurocholic acid natrium) the pelvesterol has a remarkable activity for the lipolytic action of pancreas lipase.

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Butenandt: *Z. f. physiol. Chem.* 237, 57 (1935).
- 2) Fernholz: *Ann.* 57, 128 (1933).
- 3) Kuwada: *J. pharm. Soc. Japan.* 56, 75 (1936).

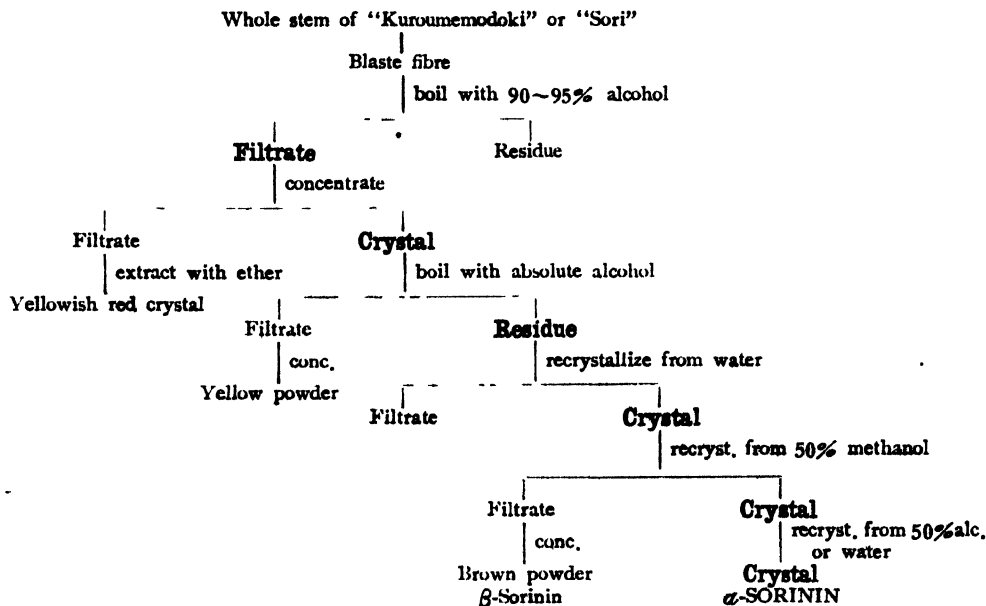
A New Glykoside from the Bark of *Rhamnus japonica*.

(pp. 352~361)

By ZIRÔ NIKUNI.

(Agr. Chem. Laboratory, Tokyo Imp. Univ., Received January 21, 1938.)

The author obtained a crystalline glycoside from the bark of "Kuroumemodoki" (*Rhamnus japonica* Maxim.) under the following method, and named it " α -Sorinin" after the Chinese name of this tree "Sori".



The glycoside resembles to "Rhamnicoside" obtained from the bark of *Rhamnus cathartica* L. by M. Bridel (Compte rendu **180** (1925), 857, 1047, 1219), but differs from it on melting point and molecular formula. Especially the former lacks the Borntrager's reaction, which characterizes the Rhamnicoside.

This new glycoside " α -Sorinin" crystallizes in colorless needles or prisms, melts at 159° (uncorr.) and browns. It has a bitter taste and is soluble in hot water, boiling 50% ethyl and methyl alcohol and crystallizes out from these solutions on cooling, easily soluble in cold ammonia and other alkaline solutions.

On exposure to the sun the aqueous and alcoholic solution of this glycoside colors violet, red and then yellow. This coloration occurs almost instantly in alkaline solution.

The analytical results are as follows :

	C %	H %	OCH ₃ %
observed	53.25	5.62	5.42
calculated as C ₂₆ H ₂₈ O ₁₄	53.31	5.22	5.74

Upon hydrolysis with dilute mineral acids or boiling water, α -Sorinin yields an aglycon and sugars.

The aglycon " α -Sorigenin" is almost insoluble even in boiling water, slightly soluble in ethyl and methyl alcohol and more easily in boiling alcohol and cold pyridin. From alcohol it crystallizes out in slightly yellowish needles, melts at $227\sim 229^\circ$ and becomes brown. It colors also by sun light.

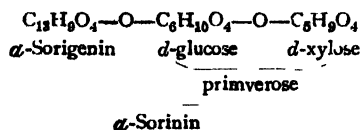
The constitution of this aglycon is now investigating. But the molecular formula is considered as $C_{13}H_{10}O_5$ by the analytical results of the aglycon and its several derivatives.

α -Sorigenin	C %	H %	OCH ₃ %	
observed	63.44	4.17	12.79	
calculated as $C_{13}H_{10}O_5$	63.39	4.09	12.60	
Diacetyl- α -Sorigenin	C%	H%	OCH ₃ %	COCH ₃ % mol. weight
observed	62.02	4.26	8.55	25.66 312
calculated as $C_{13}H_5O_5(CH_3CO)_2$	61.79	4.27	9.35	26.06 330.112
Monomethyl- α -Sorigenin	C%	H%	OCH ₃ %	mol. weight
observed	64.62	4.84	23.69	269.2
calculated as $C_{14}H_{12}O_5$	64.59	4.65	23.83	260.096
Dimethyl- α -Sorigenin	C%	H%	OCH ₃ %	mol. weight
observed	66.10	5.31	33.26	294
calculated as $C_{15}H_{14}O_5$	65.66	5.14	33.95	274.112

The sugar components of this glycoside by acid hydrolysis are *d*-glucose and *d*-xylose. They are determined as their phenylosazones.

From the hydrolysed solution by hot water (1 part of α -Sorinin was boiled with 100 parts of water over 30 minutes) obtained a disaccharide in the form of very fine bundle of needles. And decided it as the primverose from its melting point, specific rotation, osazone, analytical results and decomposition products (namely *d*-glucose and *d*-xylose.)

Therefore α -Sorinin is showed as follows :



The author expresses his sincere thanks to Prof. B. Suzuki for his kind guidance throughout this work.

On the Production of Ethylenoxide- α , β -2-Carboxylic Acid by Moulds. Part II.

(pp. 362~365)

Kinichirô SAKAGUCHI, Tatsuichiro INOUE and Seiji TADA.

(Tokyo Imperial University, Received Jan. 8, 1938.)

1. *l*-trans-ethylenoxide- α , β -2-carboxylic acid, as described by R. Kuhn⁽¹⁾,

was synthesised from maleic acid by conversion into mono-brom-malic acid followed by debromination and dehydration; the resultant α -l-acid being separated into active forms through its morphin salt. Direct comparison of it with the acid obtained by the authors from the metabolism solution of a mould⁽²⁾ showed that they are the same substance. A mixed melting point did not show any depression.

2. The effects of the temperature of the fermentation and the concentration of glucose in the medium upon the production of the acid were examined.

3. The acid was produced from sucrose, fructose, glucose, mannitol, sorbitol, arabinose, xylose, erythritol, 2-3-butylenglycol as well as glycerin. It is interesting that the acid was synthesised by the mould from glycerin to the extent of 5.8% of the latter consumed.

4. Citric and fumaric acids were also confirmed among the metabolic products of the mould.

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- (1) R. Kuhn u. F. Ebel: Ber., **58** (1925), 919.
R. Kuhn u. R. Zell: Ber., **59** (1926), 2514.
- (2) K. Sakaguchi, T. Inoue and S. Tada: This Journal, **13** (1937), 241.

On the Production of Ethylenoxide- α , β -dicarboxylic Acid by Moulds. Part III.

(pp. 366~373)

Kinichiro SAKAGUCHI and Tatsuwichiro INOUE.

(Tokyo Imperial University, Received Jan., 8, 1938.)

In the present work taxonomic investigations on the organism which caused the new fermentation were carried out. It is obvious from the following descriptions that the mould may be classed in the genus *Monilia*.

The organism was isolated from a botanical specimen preserved in a dilute formaldehyde solution from Kagi, Formosa. Colonies on Koji-extract-agar light yellowish brown passing to greyish yellow in age (Pale Olive Buff to Dark Olive Buff, Cream Buff, Cartridge Buff, Honey Yellow, Citrine Drab or Camoëls according to media and age: Ridgway's Colour Standards, 1912, Washington), forming rather closely felted aerial masses 3~5 mm deep especially in the center. Reverse almost white or with some shades of yellow or orange* (Antimony Yellow, Zinc Orange or Isabella Colour: Ridgway). Conidia smooth, light yellowish, mostly elliptic or somewhat spindle shaped and ovate or subglobose partly, $4\sim7\mu \times 1.5\sim4\mu$ or $4\sim5\mu$ in diameter. Conidiophores not sharply distinguished from the hyphae of the vegetative mycelium which is colourless, septate, $3\sim5\mu$ in diameter.

The optimum temperature for growth near 35°C and the inhibition below 9~12°C or above 47°C. Conidia are killed by heating at 62°C for 30 minutes or 65°C~5 minutes. The optimum pH at near 5.1~6.5. It grow readily on ordinary culture media for moulds such as Koji-extract, wort, Czapek's, Pfeffer's, Henneberg's, Hayduck's, Woltje's solutions or the nitrite medium of Sakaguchi and Wang (this Journal 10 (1934), 459). Against formaldehyde it is resistant up to 7% and grow well at 0.5%. Amylase, invertase, maltase, protease, lipase, lab-enzyme, urease, emulsin, catalase and zymase are formed. As its metabolic products laevo rotatory ethylen-oxide-dicarboxylic, citric and fumaric acids as well as mannitol are found.

On the Production of Succinic Acid by *Bacterium Succinicum* nov. sp.

(pp. 374~387)

Kinichiro SAKAGUCHI and Seiji TADA.

(Tokyo Imperial University, Received Jan., 8, 1938.)

1. The authors have isolated from a certain cheese a new bacteria which form abundant quantities of succinic acid from various organic acids.

Substrates	The yields of succinic acid	
	Against the quantities of substrates used	Against the theoretical yields*
citric acid	57.83%	94.00%
d-tartaric acid	45.10	57.43
l-malic acid	25.04	28.44
fumaric acid	28.60	28.11

* On assuming that one molecule of succinic acid may be formed from each molecule of the substrates.

2. The properties of the new bacteria are as follows.

Bacterium succinicum nov. sp.

Morphology:-

Short rods, 1.3~2.1 by 0.6~0.8 μ , with rounded ends, occurring singly. Motile with peritrichous flagella. No endospore formation. Gram negative.

Cultural characteristics:-

Gelatin colonies: small, round, white, glistening and especially with greenish shimmer when young.

Gelatine stab: no liquefaction. Spreading all over the surface, very poor growth in depth.

Agar colonies and stab: similar to those on gelatine.

Broth: very turbid, with thin pericle and mucous sediments.

Litmus milk: acid, with coagulation. No peptonization.

Potato: scanty growth.

Cohn's, Uschinsky's or Czapek's solution: no growth.

Biochemical properties:—

Indol not formed.

Acetyl-methyl-carbinol not formed (Voges-Proskauer's and Omera's tests were used).

Nitrate reduced.

Hydrogen sulfide formed.

Methyl red test positive in glucose and lactose. Acid and gas in raffinose, trehalose, sucrose, lactose, maltose, glucose, fructose, galactose, mannose, xylose, arabinose and glycerin. Gas in sorbitol. Neither gas nor acid in starch, glycogen, dextrin, inulin, melecitose, dulcitol, salycin and erythritol.

Succinic, lactic and acetic acids, 2-3-butylenglycol and ethyl alcohol are formed from glucose.

Aerobic facultative.

Optimum temperature 33°C. Optim. pH 6.5~7.0.

3. General bacteriological investigations were carried out with known 17 strains of bacteria related to *Bact. succinicum*.

They were divided into four groups according to the modes of decomposition of citric acid.

	Rates of decomposition of citric acid	Quantities of the decomposition products of citric acid.		
		succinic acid	acetic acid	formic acid
1st group	100%	up to 7%	60%	6~0.5%
2nd group	50	up to 7%	not formed	not formed
3rd group	50	trace or not formed	10%	trace or not formed
4th group	50	not formed	not formed	not formed
<i>B. succinicum</i>	100	up to 54%	20%	not formed

To the first group were found to belong two strains of *Aerobacter oxytocum*, three strains of *Aerob. cloacae*, *Aerob. levans* and *Escherichia formicum*; to the second *Aerob. liquefaciens* and *Aerob. aerogenes*; to the third two strains of *Esch. communior* and to the fourth *Esch. alve* and *Esch. ichthyosmia*.

4. The conditions for the industrial production of succinic acid through the fermentation of citric acid by *Bac. succinicum* were studied in detail.

Action of a Green Fluorescent Substance Like Acetyl Flavin on Plants and Animals. (Part II.)

(pp. 388~391)

By Tetutarō TADOKORO and Tuneyuki SAITO.

(Hokkaido Imperial University, Japan. Received Jan. 14, 1938.)

On the Colouring Matter of Sugar Cane named Badilla.

(pp. 392~396)

By Yasuyosi OSIMA and Ryo YAMAMOTO.

(Agr. Chem. Dept., Taihoku Imp. Univ., Taiwan, Formosa.

Received Jan. 24, 1938.)

The authors have isolated the colouring matter from the bark of sugar cane named Badilla or N.G. 15, which was called "Ancha" and cultivated for food in Formosa.

The colouring matter was precipitated from methanol extract by lead acetate and decomposed by HCl-methanol. From the methanol extract thus obtained, colouring matter was precipitated by the adding of 5 to 6 volumes of ether. The crude pigment was purified by the solubility to methanol in four parts.

The colouring matter was reddish-violet powder and has no sugar and methoxyl group. Its chemical composition and colour reaction was very similar to cyanidin chloride but distinguished from the absorption spectra and it has changed to insoluble matter like phlobaphene by treatment of mineral acid.

The absorption spectra was much similar to the reduction product of quercetin by zinc dust and acetic anhydride but was differed from the reduction product by sodium-amalgam and cyanidin chloride isolated from Kuromame which belongs of Glycine Soja Benth.

Then the colouring matter of Sugar cane named Badilla was thought a substance like quercetylene chloride possibly according to the opinion of Nierenstein (J. Am. Chem. Soc., 52, 2864, 1930).

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noticed)

Über die Acetylmethylcarbinol- und 2, 3-Butylenglykol-Bildung durch Mikroben. (V).

Optische Eigenschaften des Acetylmethylcarbinols (Acetoin).

(ss. 397~405)

Von Yukio TOMIYASU.

(Aus dem Agrikulturchemischen Institut der Kaiserlichen Kyushu-Universität,
Eingegangen am 31, 1, 1938.)

1) Da das Acetoin oft im Verlauf der Isolierung oder der Garung razemisiert, muss man darauf beachten, die Drehung direkt in der vergorenen Lösung und zwar möglichst kurz nach der Impfung zu messen, um den wahren Wert zu ermitteln. Verfasser hat eine Methode angegeben, mit der die optische Drehung des Acetoin gemessen werden kann. Die Methode beruht darauf, dass die optische Drehung des Destillats der Gäransätze ausschliesslich durch die Anwesenheit des Acetoin verursacht worden ist.

2) Garungsacetoin zeigt eine weit grössere Drehung, als bisher beschrieben wurde. Seine spezifische Drehung ist charakteristisch für die Mikroorganismen, so beträgt z.B. bei *Bacillus natto* $[\alpha]_D = -98$; bei *Bacillus mesentericus fuscus*, -78 ; bei *Bacillus lactis aerogenes*, -66 ; bei Bierhefe, -40 ; bei Hefe-Mazerationssaft, -40 .

3) Das Vorhandensein von Hefezellen sowie von Zucker war ohne Einfluss auf die Drehung: d.h. in allen Fällen entstand ein Acetoin mit fast konstanter Drehung, und zwar sowohl mit Frischhefe als auch mit Hefesaft.

4) Das primär gebildete Acetoin ist immer Linksform, aber nachher kann es allmählich auf verschiedene Weise, wie Razemisierung, Verzehrung u. a., verändert werden.

5) Bierhefe, wenn sie razemischem Acetoin zugefügt wird, verzehrt überwiegend die Linkskomponente und lässt die Rechtsform zurück.

6) Aus obigen Tatsachen (4., 5.) ergibt sich, dass die linksdrehende Form

physiologisches Acetoin sein muss.

7) Einige Diskussionen werden über die optischen Eigenschaften des 2, 3-Butylenglykols angegeben.

Untersuchungen über den Abbau von Acetoin durch Mikroben. (I).

Über die VOGES-PROSKAUERSche Reaktion.

(ss. 406~410)

Von Yukio TOMIYASU.

(Aus dem Agrikulturchemischen Institut der Kaiserlichen Kyushu-Universität;
Eingegangen am 31. 1. 1938.)

Auf welche Weise die V-P Reaktion angewendet werden soll, um die Acetoin-Produktion sicher nachzuweisen, wurde durch Untersuchungen mit 31 Bakterienstämmen der Coli-Aerogenes Gruppe festgestellt; es wurden folgende Ergebnisse erzielt.

1) Unter den 31 zum Experiment gebrauchten Stämmen waren 3 Stämme V-P positiv, die übrigen 28 negativ. Unter den 3 V-P positiven Stämmen konnte man nochmals 2 Arten unterscheiden, und zwar blieb bei einem Stamm die Reaktion konstant, dagegen war bei den anderen 2 Stämmen die Reaktion allmählich schwächer und schliesslich nach etwa 3 Tagen gänzlich negativ geworden.

2) Bei Prüfung von Auf- und Abbau des Acetoins durch die V-P Reaktion ist die optimale Zuckerkonzentration des Milieus etwa 0.5%. Ist der Zuckergehalt des Mediums niedriger als 0.2%, so findet keine Acetoin-Produktion statt.

3) Bei niedrigerem Zuckergehalt als 0.5 % kommt es je nach der Bakterienart bisweilen vor, dass die Acetoin-Reaktion ziemlich schnell verschwindet. Deshalb genügt es keineswegs, wie es üblich ist, die V-P Prüfung innerhalb einiger Tage oder einer Woche nach der Impfung nur einmal auszuführen, sondern ist es notwendig, um ein zuverlässiges Resultat zu erzielen, von 1 bis 3~4 Tage nach der Impfung täglich einmal die Prüfung auszuführen.

4) Der Acetoin-Aufbau, wenn der Zucker überhaupt durch die Bakterien assimilierbar ist, ist von den Zuckerarten unabhängig.

5) Weil das pH des Mediums ohne Einfluss auf die V-P Reaktion ist, wenn es 6~9 beträgt, ist bei der Darstellung des Mediums eine spezielle Vorsicht nicht notwendig.

6) Im Bereich meiner Experimente besitzen nur einige Bakterien der Acetoin-produzierenden Aerogenes-Gruppe, die Fähigkeit, Acetoin wieder abzubauen; dagegen besitzen die Nicht-Acetoinbildner (Coli-Gruppe) überhaupt keine Abbau-Fähigkeit.

Untersuchungen über den Abbau von Acetoin durch Mikroben. (II).

Experimenteller Nachweis der Acetoin-
Assimilierung durch Mikroben.

(ss. 411~414)

Von Yukio TOMIYASU.

(Aus dem Agrikulturchemischen Institut der Kaiserlichen Kyushu-Universität;
Eingegangen am 31, 1, 1938.)

1) Dass die Voges-Proskauersche Reaktion im Verlauf der Kultur allmählich schwächer und schliesslich negativ geworden ist, ist der Überführung des Acetoin in 2, 3-Butylenglykol durch Reduktion nicht zuzuschreiben.

2) Im Versuch mit einem synthetischen Medium, in welchem als C-Quelle nur Acetoin diente, waren nur 2 (Aerogenes Gruppe) von 31 Stämmen (Coli-Aerogenes Gruppe) vermehrbar; bei diesen 2 Stämmen fiel die V-P Reaktion im Verlauf der Kultur endlich negativ aus, und die übrigen 29 Stämme, ohne solche Eigenschaften, waren nicht vermehrbar (siehe 1. Mitteilung).

3) Im Versuch im synthetischen Medium, in welchem als C-Quelle nur Acetoin gebraucht wurde, verlief die Bakterienzellen mit dem Verschwinden des Acetoin ganz parallel.

4) Als Abbauprodukt des Acetoin wurde nur Essigsäure nachgewiesen.

5) Aus den obigen Tatsachen geht einwandfrei hervor, dass das Acetoin als C-Quelle durch Bakterien benutzt wird.

On the Unsaponifiable Matter of the Alge Fats. V.

On the "activity curves" for lipolytic action and
the spectrum of pelvesterol.

(pp. 415~420)

By K. SHIRAHAMA.

(Agr. Chemical Laboratory, Hokkaido Imp. Univ., Received Dec. 2, 1937.)

The author has newly isolated pure pelvesterols from two algae.
From leaves of *Alaria crassifolia* Kjellm.

Sterol	mp 124°	-41.6°
Sterol acetate	mp 119.5°	-46.9°

From *Cystophyllum hakodatense* Yendo.

Sterol	mp 124°	-41.5°
Steryl acetate	mp 119.5°	-46.6°

Above two sterols closely agreed with each other in the forms of curves denoting the activity for the lipolytic action and showed the same spectrum which had no absorption band.

Two more sterols had also been isolated from the same algae, the one from sporophylls of *Alaria* and the other in the course of the purification of above-sterols.

On the Unsaponifiable Matter of the Alge Fats. VI.

On some activators for lipolytic action.

(pp. 421~422)

By K. SHIRAHAMA.

(Agr. Chemical Laboratory, Hokkaido Imp. Univ., Received Dec. 9, 1937.)

In the liquid unsaponifiable matter after excluded sterol, some activators for lipolytic action may exist.

It is remarkable in the distilled fraction of the extracts with 80% methanol (cramp toxin fraction).

Several commercial vitamin and hormone preparations act as inhibitors for the lipolytic action.

Feeding Experiments with Decomposition Products of Proteins. (VI).

On the Isolation of a New Essential Factor, Oxyaminobutyric acid.

(pp. 423~440)

By Siro MAEDA.

(The Institute of Physics¹ and Chemical Reserch, Received May 28, 1937.)

Influence of Three Essential Elements (N.P.K) on the Yield and Quality of An Egg-plant.

(pp. 441~449)

By Chikafumi ICHIKAWA.

¶(The Soma Agricultural and Sericultural School.,

Received Jan. 19, 1938.)

Untersuchungen über die Verwitterung der Eruptivgesteine V.

Zusammensetzung des Tons aus Basaltboden.

(ss. 450~458)

Von Mituru HARADA.

(Landwirtschaftliche Hochschule Tottori, Angeg. am 4, 2, 1938)

Die chemische Untersuchung der Tone ($<0,002$ mm) sowohl der Olivinbasaltboden aus der Präfektur Tottori, als auch der Nephelin- und der Trachybasaltboden aus der Präfektur Simane erfolgte durch die Bauschanalyse, den Schwefelsaure- und Salzsäure-Auszug.

Aus den analytischen Ergebnissen ergibt sich: 1) bei dem photochemischen Verfahren wurde die Probe durch die Oxalsäure-Kaliumoxalatlösung I⁽¹⁾ zu fast weisser Farbe gebleicht; 77~90% des Gesamteisenoxydes oder 96~100% des in Salzsäure löslichen Eisenoxydes liegen in freier Form vor; 2) die Kieselsäure ist grösstenteils nur an Tonerde gebunden; 3) im Komplex A besteht das Molekularverhältnis $\text{SiO}_2 : \text{Al}_2\text{O}_3 = 2$ (Halloysit) und im Komplex B ebenfalls das Molekularverhältnis 2 (Kaolinit); 4) die Tone der Oberboden sind armer an Komplex A und reicher an Komplex B als die Tone der Unterboden; 5) im Vergleich zum Feinboden (<2 mm) enthält der Ton mehr Komplex B bei den Olivinbasaltboden oder mehr Komplex A bei den Nephelinbasaltboden; 6) das Verhältnis von limonitischem Fe_2O_3 zu hamatischem Fe_2O_3 ist bei den Tönen grosser als bei den Feinboden; 7) man kann bei dem Feinboden deutlicher als bei dem Ton zeigen, dass bei der Verwitterung erst die Bildung von Halloysit und Limonit, und dann die Kaolinitisierung und die Bildung des Hamatits stattfindet.

Tabelle I. Bauschanalyse des Tons ($<0,002$ mm). (%)

	Olivinbasalt Profil		Nephelinbasalt Profil		Trachybasalt Profil	
	Mittelhorizont (Unterboden) [III]	Oberhorizont (Oberboden) [IV]	Unterhorizont (Unterboden) [III]	Oberhorizont (Oberboden) [IV]	Mittelhorizont (Unterboden) [III]	Oberhorizont (Oberboden) [IV]
SiO_2	38,93	40,37	37,82	39,43	38,94	40,80
Al_2O_3	22,01	33,40	32,06	29,85	33,49	33,74
Fe_2O_3	12,06	10,90	11,88	13,16	8,25	8,10
MnO	0,19	0,10	0,03	0,04	0,34	0,30
MgO	0,42	0,11	0,35	0,53	0,64	0,26
CaO	0,09	0,08	0,30	0,31	0,83	0,65
Na_2O	0,86	0,59	0,43	0,33	1,20	0,54
K_2O	0,79	0,94	0,69	1,01	1,23	0,50
TiO_2	1,19	1,11	0,99	1,92	1,11	1,01
P_2O_5	0,07	0,05	0,87	0,48	0,44	0,11
SO_3	0,51	0,18	0,19	0,21	0,21	0,50
H_2O^+	13,83	13,55	15,42	13,20	13,18	13,29
Summe	100,95	101,19	101,03	100,47	99,86	99,80
ki	2,03	2,05	2,01	2,24	1,97	2,05

Tabelle II. Salzsäure- und Schwefelsäureauszug
des Tons (<0,002 mm). (%)

	Salzsäureauszug						Schwefelsäureauszug					
	Olivinbasalt Profil		Nephelin- basalt Profil		Trachybasalt Profil		Olivinbasalt Profil		Nephelin- basalt Profil		Trachybasalt Profil	
	(III)	(IV)	(III)	(IV)	(III)	(IV)	(III)	(IV)	(III)	(IV)	(III)	(IV)
SiO ₂	13,30	12,08	16,32	5,89	28,26	19,71	24,06	25,91	21,46	25,89	8,93	15,71
Al ₂ O ₃	10,52	10,25	15,31	5,10	25,61	16,36	21,06	21,80	16,81	21,80	7,59	12,68
Fe ₂ O ₃	9,30	8,49	10,98	11,93	7,69	7,12	1,65	2,18	0,82	1,12	0,41	0,94
MnO	0,19	0,09	0,03	0,02	0,32	0,28	—	—	—	—	—	—
MgO	0,04	0,02	0,17	0,03	0,18	0,12	0,04	0,04	0,16	0,36	0,42	0,11
CaO	0,04	0,04	0,25	0,15	0,74	0,57	0,04	0,05	0,03	0,09	0,07	0,06
Na ₂ O	0,27	0,17	0,16	0,06	0,12	0,10	0,36	0,41	0,26	0,20	1,08	0,33
K ₂ O	0,33	0,54	0,24	0,23	0,05	0,05	0,36	0,40	0,43	0,46	1,17	0,11
TiO ₂	0,45	0,18	0,43	0,45	0,76	0,34	0,60	0,92	0,55	1,40	0,32	0,66
P ₂ O ₅	0,07	0,06	0,85	0,31	0,43	0,08	—	—	—	—	—	—
SO ₃	0,51	0,17	0,18	0,18	0,19	0,49	—	—	—	—	—	—
Summe	35,02	32,09	44,92	24,35	64,35	45,22	48,17	51,71	40,52	51,32	19,99	30,60
k ₁	2,15	2,00	1,80	1,96	1,87	2,05	1,98	2,02	2,17	2,02	2,00	2,10

Tabelle III. Freies Fe₂O₃ des Tons (<0,002 mm).

		Limonitisches Fe ₂ O ₃		Humatisches Fe ₂ O ₃		Freies Fe ₂ O ₃	
		%	in % des in konz. lösl. Fe ₂ O ₃	%	in % des in konz. HCl lösl. Fe ₂ O ₃	%	in % des in konz. HCl lösl. Fe ₂ O ₃
Olivinbasalt Profil	(III)	7,75	83,3	0,67	7,2	9,27	99,7
	(IV)	6,14	72,3	1,80	21,2	8,28	97,5
Nephelin- basalt Profil	(III)	9,54	86,9	0,28	2,6	10,51	95,7
	(IV)	3,84	29,7	7,80	60,3	11,64	97,6
Trachy- basalt Profil	(III)	6,81	88,6	0,25	3,3	7,40	96,2
	(IV)	5,99	84,1	0,48	6,7	6,89	96,8

Tabelle IV. Bauschanalyse des Gesteins und Bodens (<2 mm). (%)

	Olivinbasalt Profil				Nephelinbasalt Profil				Trachybasalt Profil			
	Gestein (I)	Un erhorizont (II)	Mittelhorizont (III)	Oberhorizont (IV)	Gestein	Verwitterte Schicht über frischem Gestein (II)	Unterhorizont (III)	Oberhorizont (IV)	Gestein (I)	Unterhorizont (II)	Mittelhorizont (III)	Oberhorizont (IV)
SiO ₂	49,66	36,68	37,83	39,83	38,86	31,47	34,85	43,13	52,50	47,57	46,28	51,42
Al ₂ O ₃	16,81	30,29	28,39	30,76	11,57	8,22	27,95	26,01	17,26	22,46	25,83	23,93

Fe ₂ O ₃	2,79	17,31	17,23	13,65	3,53	31,26	19,57	15,16	3,21	10,23	11,32	5,11
FeO	6,06	—	—	—	10,71	—	—	—	4,22	—	—	—
MnO	0,27	0,24	0,22	0,24	0,31	0,36	0,77	0,14	0,10	0,34	0,38	0,49
MgO	8,94	0,65	0,74	0,38	8,70	5,81	1,00	1,29	4,29	3,81	2,22	2,10
CaO	10,18	0,51	0,60	0,50	15,71	11,56	1,01	0,34	9,04	3,63	1,22	0,56
Na ₂ O	2,80	0,74	0,55	0,38	3,35	0,71	0,72	0,76	4,59	3,73	1,29	1,56
K ₂ O	0,84	0,31	0,20	0,25	1,21	0,70	0,70	1,01	2,54	1,97	1,51	1,36
TiO ₂	1,16	1,54	1,51	1,36	1,48	2,51	2,31	2,18	1,43	1,70	1,97	1,25
P ₂ O ₅	0,22	0,07	0,12	0,04	1,67	0,55	0,87	0,44	0,82	1,07	0,28	0,46
SO ₃	0,03	0,09	0,08	0,13	0,22	0,56	0,10	0,07	0,07	0,08	0,05	0,08
H ₂ O+	0,58	11,47	12,84	13,18	3,25	6,04	11,22	10,06	0,33	4,78	8,24	12,94
Summe	100,34	99,90	100,39	100,70	100,57	99,75	101,07	100,59	100,40	101,37	100,59	101,26
k ₁	5,02	2,06	2,26	2,20	5,70	6,50	2,12	2,81	5,17	3,60	3,04	3,65

Tabelle V Salzsäureauszug des Bodens (<2 mm). (%)

	Olivinbasalt Profil			Nephelinbasalt Profil			Trachybasalt Profil		
	(II)	(III)	(IV)	(II)	(III)	(IV)	(II)	(III)	(IV)
SiO ₂	32,04	29,64	23,53	11,00	10,21	4,30	14,28	19,19	14,01
Al ₂ O ₃	25,65	24,59	23,44	7,41	8,48	5,18	12,59	16,70	14,27
Fe ₂ O ₃	16,92	17,15	12,78	29,03	17,83	13,50	9,33	10,20	4,27
MnO	0,24	0,34	0,27	0,21	0,55	0,51	0,28	0,21	0,47
MgO	0,50	0,59	0,32	1,07	0,47	0,22	1,82	1,06	1,07
CaO	0,07	0,16	0,05	1,68	0,79	0,39	1,45	0,29	0,42
Na ₂ O	0,15	0,14	0,13	0,01	0,05	0,06	0,07	0,07	0,09
K ₂ O	0,05	0,15	0,06	0,18	0,04	0,10	0,10	0,10	0,11
TiO ₂	0,14	0,17	0,13	0,88	0,77	0,42	0,84	0,96	0,40
P ₂ O ₅	0,06	0,09	0,02	0,27	0,58	0,18	0,58	0,19	0,36
SO ₃	0,09	0,08	0,12	0,49	0,02	0,22	0,03	0,03	0,05
Summe	75,92	73,00	60,85	52,23	39,80	25,08	41,37	49,00	35,52
k ₁	2,12	2,05	1,70	2,52	2,05	1,41	1,93	1,95	1,67

Tabelle VI. Schwefelsäureauszug des Bodens (<2 mm). (%)

	Olivinbasalt Profil			Nephelinbasalt Profil			Trachybasalt Profil		
	(II)	(III)	(IV)	(II)	(III)	(IV)	(II)	(III)	(IV)
SiO ₂	2,26	2,80	8,36	0,72	20,53	24,66	3,53	6,45	7,74
Al ₂ O ₃	1,84	2,33	6,74	0,10	17,79	20,62	1,92	5,23	6,43
Fe ₂ O ₃	0,37	0,43	1,20	0,25	0,82	1,36	0,59	0,85	0,86
MgO	0,14	0,14	0,14	—	0,28	0,35	0,19	—	—
CaO	0,02	0,04	0,03	—	—	—	0,12	—	—
Na ₂ O	0,24	0,23	0,24	—	0,62	0,69	0,12	0,09	0,13
K ₂ O	0,03	0,04	0,11	—	0,68	0,55	0,08	0,08	0,13
TiO	1,00	1,38	1,21	0,57	1,52	1,73	0,85	1,01	0,80

Summe	5,90	7,39	18,03	1,64	42,24	49,96	7,40	13,71	16,09
ka	2,08	2,04	2,11	12,22	1,96	2,03	3,13	2,10	2,04

LITERATUR

(1) Harada, M: Bull. Agr. Chem. Soc. Japan, 13, 39~44 (1936).

Berichtigungen

Untersuchungen über die Verwitterung der Eruptivgesteine III, diese Zeitschrift 12, 142~146, (1936).

		es heisst			muss heissen		
Tabelle IV	5 Zeile von Unten	38,849	53,77	46,23	42,718	32,84	67,16
	4 Zeile von Unten	45,909	16,09	83,91	49,881	15,03	34,97
	1 Zeile von Unten	56,54	43,46		64,91	35,09	

Seite 146. Die richtige Abb. 2 ist folgende:

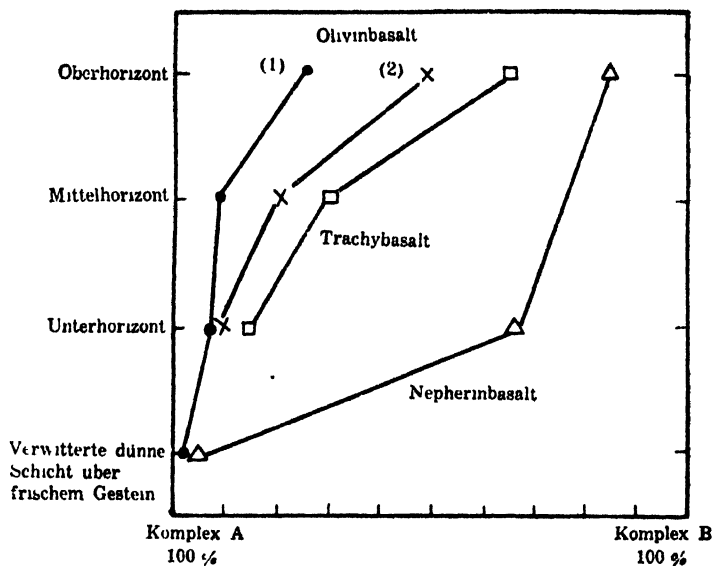


Abb 1

Untersuchungen über die Verwitterung der Eruptivgestein IV, diese Zeitschrift 13, 39~44, (1937).

Seite	Zeile	es heisst	muss heissen
39	1 Z	Untersuchung	Untersuchungen
"	4 Z	Agrikultur Kollege	Agricultural College
"	9 Z	uan	und
"	2 Z von unten	öfteren	öfterem Umrühren
40	11 Z	wirallmahlich	wird allmählich
"	12 Z	shwacher	schwächer
42	5 Z von unten	Abb 2	Abb. 2
"	4. Z. von unten	Résiduumboden	Residuumböden
"	3 Z. von unten	Alluvialboden	Alluvialböden

43	1. Z.	boden	böden
"	Tabelle IV	<2,002	<0,002
		<2.000	<0,002
		vulkanischer	vulkanischer
		Aschenboden Nr. 2	Aschenboden Nr. 2
		<0,002	<2

Plant Nutritious Study of "Kenaf" (*Hibiscus cannabinus* L.) Part I.

(pp. 459~473)

By Minoru IKEDA and Tatewaki INADOME.

(Agric. Exp. Sta., Kunchuling, Manchoukuo, Received Feb. 1, 1938.)

In this paper two problems are studied viz., 1) the study of nitrogen, phosphorous, and potassium absorption and the growth of "Kenaf" by means of water culture method. 2) the influence of nitrogen, phosphorous and potassium on the tissue of "Kenaf" stem. The growth of "Kenaf" stem in the plot of three elements is the most favourable, no nitrogen plot is in the second place, and the growth in the plot of no phosphorous and no potassium are very poor. For the growth of "Kenaf" phosphorous and potassium are indispensable nutrients, and when either phosphorous or potassium is lack, "Kenaf" can not obtain the normal growth. Phosphorous effects on the development of fibrous tissue especially of fibrous layers. When no potassium the development of fibrous layers and the fullness of fibrous cells are very poor and number of cells in fibrous rings is very few.

Studies on High Sugar Diet. I.

(pp. 474~484)

By Yosito SAKURAI, Tanehide KASUWA and Sizu OMORI.

(Institute of Dietary Science, Kawasaki, Japan, Received Feb. 2, 1938.)

Rats, receiving the diet containing sufficient amount of vitamin B₁ and B₂ as the B-complex, failed to increase their body weights and developed the symptoms of dermatitis after 5 or 6 weeks. The syndromes developed severer and earlier when sucrose was used as the source of carbohydrate and this was true not only when highly purified sucrose was supplied, but also crude, colored preparations of sucrose which are belonging to the centrifugal sugar were given. But the dermatitis was protected or cured by the use of cane juice concentrate or by the addition of 5% exhausted cane molasses to the basal diet, thus showing that the dermatitis preventing factor, now known as vitamin B₆, was separated off in the course of the purification of sucrose from cane juice.

The basal diets used in these experiments were as follows;

Sucrose	70	Polished rice powder	75
Fish protein	15	Fish protein	10
Egg white dried	10		
Salts mixture	5		

Cod liver oil	2 drops per day per rat
Absorbed acid clay	5 mg per day per rat

(This absorbed clay had been previously determined that it contained effective vitamin B₁ with B₃ mg daily supply, but is almost absent in B₂ and B₆.)

The cane juice concentrate and the cane molasses were very poor both in vitamin B₁ and B₂.

Cow's milk was an effective source of vitamin B₆, and rats fed on condensed milk only, which contains about 58% sucrose and 16% lactose as dry matter, grew normally and developed no symptom of the deficient disease. Vitamin B₁ was also sufficient in the condensed milk tested. The mixture of equal part of sucrose and whole milk powder did not bring normal growth, though any symptom of dermatitis was not detected. It is supposed some of the factors were destroyed during the drying process of milk. When the mixture of equal quantity of lactose and whole milk powder was supplied most rats died in 1 or 2 weeks, but the survived rats increased their body weights gradually in spite of all rats suffered from constant diarrhea and some of them developed cataract.

On the Retting of some Vegetable-Fibre-Materials (Part IV).

The Characteristics of the Effective Bacteria for
the Retting of Ramie.

(pp. 488~491)

By Toshio NAKAHAMA and Shunichi NISHIMURA.

(Chemical Laboratory, Kanebo Hikone Factory, Received Feb 12, 1938)

The effective bacteria for the retting of ramie (see Part II) was found to reveal very much the same natives with *Bacillus subtilis* Cohn, and we determined to call the bacteria "*Bacillus subtilis* var. *Ramie*".

On the Retting of Some Vegetable-Fibre-Materials (Part V).

On the Results of the Retting of Some Vegetable-Fibre-
Materials with *Bacillus subtilis* var *Ramie*.

(pp. 492~497)

By Toshio NAKAHAMA and Shun-ichi NISHIMURA.

(Chemical Laboratory, Kanebo Hikone Factory, Received Feb 12, 1938)

The effects of retting with the bacteria were greatest for ramie of some vegetable-fibre-materials.

Feeding Experiments with Decomposition Products of Proteins. (VII).

On the Nutritive Significance of Histidine, Arginine and Lysine.

(pp. 498~503)

By Siro MAEDA.

(The Institute of Physical and Chemical Research, Received May, 28 1937)

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noticed)

Biochemical Studies on "Sotetsu" (*Cycar revoluta* Thunb.). Part IX.

On the chemical constituent of the outer spermoderm of "Sotetsu"-seed.

(pp. 505~506)

By Kotaro NISHIDA.

(Kagoshima Agricultural College, Received Apr. 7, 1938)

An Improved Method to Determine the Digestibility of Protein in Fish Meal.

(pp. 507~511)

By Kokichi OSHIMA and Shinichi ITAYA.

(From the Chemical Laboratory of the Hakodate College of Fisheries, Japan,

Received Apr 10, 1938)

The authors published in 1934 a new method to determine the digestibility of protein in fish meal, which is now improved as follows:—

In an Erlenmeyer's flask of 300 cc capacity mix 2 g fish meal, from which the oil has been extracted and which has been passed through a 0.5 mm sieve, 100 cc of 0.2 *N* HCl and 100 cc of 1.0% pepsin made by Parke, Davis, and Co. in U. S. A., and close it with a cork.

The flask is kept in an incubator of 37~38°C for 44 hours with occasional (five times are enough) shakings.

After the digestion, the content is filtered through a filter paper, washed with hot water and the residue is analyzed for its total nitrogen by Kjeldahl's method.

The nitrogen of pure protein in the original fish meal (oil extracted) is also determined by Barnstein's method.

$$\text{The digestibility of the pure protein} = \frac{\text{Pure protein N} - \text{Residue N}}{\text{Pure protein N}} \times 100.$$

The Relation of the Qualities and the Manufacturing Method of Fish Meal and Scrap.

(pp. 512~517)

By Kokichi OSHIMA and Shinichi ITAYA.

(From the Chemical Laboratory of the Hakodate College of Fisheries, Japan,

Received Apr. 10, 1938.)

The following samples were analyzed for their protein digestibility, ether extract, benzol extract, ammonia, total nitrogen, and hydrogen ion concentration of the water extract.

Method of manufacture	Raw material		Local ties	
	Sardine	Other fishes	Foreign	Domestic
Sun dried (cooked)	7	—	—	7
Steam dried	8	5	5	8
Flame dried	4	2	6	—
Vacuum dried	2	—	2	—
Roasted	3	—	—	3

1. The steam dried meals have the best digestibility of the protein; the sun dried and vacuum dried meals the second, while the flame dried and the roasted meals have the least.

2. The ammonia content in the sundried meals is generally much higher than that in those made by machine.

Among the sun dried scraps the ammonia content conforms strictly in proportion to the grade of scraps, as classified by the official inspector.

3. The nitrogen content depends not on the method of manufacture, but on the kind of fishes used.

4. The hydrogen ion concentration of the water extract of fish meals shows no relation to the ammonium content, but has certain bearings to the kind of fishes used.

5. In regard to the contents of ammonia, total nitrogen, and the digestibility of protein in the sardine meals, made by machine, these produced in foreign countries are slightly better than those in the domestic products.

On the Oxidation and its Prevention of Vitamin A in Oils.

(pp. 518~524)

By Y. MASUDA.

(Agr. Chemical Laboratory, Hokkaido Imp. Univ., Received Mar. 31, 1938.)

Studies on the Action of Arginase on Canavanin and Arginine I.
The Identification of Canavanase and Arginase.

(pp. 525~531)

By Matsunosuke KITAGAWA and Yukio EGUCHI.

(Biochemical Laboratory, Department of Agriculture, Kyushu Imperial University, Fukuoka,

Received Apr. 8, 1938.)

Canavanin is hydrolysed into urea and canalin by a liver ferment, which was suggested to be a new ferment in the previous paper for the reason of the strict specificity of arginase and the characteristic structure of canavanin.

In this study, canavanase was known to be identical with arginase, considering the constancy of the ratio of activity of the two ferments in every case.

Ueber die Fabrikation des Alkohols aus rohen Bataten.

Fortgesetzte Mitteilung

(ss. 532~541)

Von M. NAKANO, K. KUBAYASHI, und TAKESITA.

(The Department of Industry, Government Research Institute, Taiwan, Japan, .

Received Apr. 11, 1938.)

Feeding Experiments with Decomposition
Products of Proteins. (VIII).

Can Norleucine replace Lesyne in the Diet?

(pp. 542~544)

By Siro MAEDA.

(The Institute of Physical and Chemical Research,

Received May. 28, 1937)

On the Alcohol-Manufacture from Jerusalem Artichoke (Part IV).

Alcoholic Fermentation of Jerusalem Artichoke.

(pp. 545~544)

By Toshinobu ASAI.

(Agricultural Chemical Laboratory, Morioka Agricultural College, Japan,

Received March 9, 1938.)

Researches on "Tundrite". Part I.

Warping of artificial lumbers.

(pp. 565~572)

By Saisuke HUZII.

(Kyoto Imperial University, Received Mar. 17, 1938.)

"Tundrite" is the commercial name of the artificial lumber (tex) made from the Tundra peat of Karahuto. The warping of several kinds of artificial lumbars and the methods to avoid such defects were studied and discussed.

Ueber die Gärungsmikroorganismen in Awamori-Bereitung (III).

Am wohlgeschmack teilnehmende Mikroorganismen
und gemischte Vergärung.
(ss. 573~589)

Von R. NAKAZAWA und M. SIMO.

(The Department of Industry, Government Resrch Institute, Taiwan, Japan,

Received Apr. 11, 1938.)

Oryzanin, "Antineuritic Vitamin."

VII. On the Activity of the Crystalline Vitamin B₁ and
the International Standard.

(pp. 590~598)

By Sator OHDAKE and Teikichi YAMAGISHI.

(Agricultural Chemical Laboratory, Faculty of Agriculture, Imperial University of Tokyo.

Recieved March 27, 1938.)

At the Second International Conference on Vitamin Standardisation,⁽¹⁾ held in London in 1934, it has been proposed to compare the potency of the crystalline vitamin B₁ preparation with the Standard Adsorption Product with the aim of ultimately adopting the pure crystalline vitamin B₁ as the International Standard. A number of results concerning it have already been reported:—

Table 1. Activity of the crystalline vitamin B₁.

Authors	B ₁ crystals, equivalent to the International standard unit.	Methods.
Ohdake & Yamagishi ⁽²⁾	0.0015 mg	Rat growth & pigeon day-dose
Waterman & Ammerman ⁽³⁾	0.005 mg	Rat growth test
Kinnersley & Peters ⁽⁴⁾	0.002 mg	Pigeon day-dose & catatorulin test
Jansen ⁽⁵⁾	0.003 mg	Rat curative test
Leong & Harris ⁽⁶⁾	0.0029 mg (Natural) 0.0028 mg (Synthetic)	Bradycardia

(1) League of Nations, Health Organisation (1934). Report of the Permanent Commission of Biological Standardisation (Geneva).

(2) Ohdake & Yamagishi:— Bull. Agr. Chem. Soc. Japan, 11, 5 (1935). Ibid. 11, 111 (1935).

(3) Watermann & Ammerman:— J. Nutrition, 10, 35 (1935).

(4) Kinnersley & Peters:— Biochem. J. 30, 985 (1936).

(5) Jansen:— Z. Vitamin Forsch, 5, 254 (1936).

(6) Leong & Harris:— Biochem. J. 29, 672 (1937).

During the past few years, however, the chemical study on vitamin B₁ made a rapid progress and at last the synthetical process for the production of the pure vitamin B₁ was discovered. The National Institute of Medical Research, London, acting as the central laboratory of the Conference, obtained a sufficient quantity of the pure synthetic B₁ preparation from four different laboratories—I. G. Farbenindustrie Aktiengesellschaft, Merck & Co. Inc., E. Merck, and Hoffmann-la Roche & Co. — and proposed to compare its biological activity with the existing standard adsorption product for the purpose of adopting the synthetic crystalline product as the international standard.

In the present communication, four kinds of materials—(1) the International Standard Adsorption Product, (2) the synthetic vitamin B₁ crystals, the proposed new standard (3) Oryzanin crystals, the natural vitamin B₁ crystals isolated from rice polishings in this laboratory and (4) "Injectio Oryzanin Fortior, Decemplex" of Sankyo & Co., the commercial B₁ preparation containing 0.5 mg of the crystalline B₁ hydrochloride in 1 c.c.—were studied as to their B₁ activities by the three known methods—(A) rat growth (B) pigeons day dose and (C) pigeons curative tests, — and the results were compared with the international standard.

EXPERIMENTAL.

(A) Rat growth test.

When young albino rats of about 40 g body weight were fed on the standard artificial diet, free from B₁, consisting of 60% of purified starch, 20% of purified casein, 15% arachis oil and 5% of McCollums salt mixture No 185, supplemented daily with three drops of cod liver oil and 0.4 g of autoclaved yeast, the body weight declined after a week (preliminary feeding) and the animals developed severe symptoms of B₁ deficiency usually in 4–5 weeks. (Control rats. Chart. 1)

(1) The Standard Adsorption Product :— Young rats, showing declining growth on the above artificial diet for a week, when supplemented daily with 5 mg of the adsorption product, they recovered and remained healthy during 5 weeks though the supplement was still insufficient for maintaining the normal growth. By supplementing daily with 10 mg, rats maintained the normal growth, gaining 8.8 g per week in average for 5 weeks. When supplemented daily with 15 mg, the growth rate was still better. (Table 2. Chart 1.) The standard growth rate in the present experiment was observed to be 8–9 g per week in average. The comparatively poor rate is due to the temperature of the animal room which could not be maintained above 17~24°C through the extremely cold winter, when the experiment was conducted.

(2) The synthetic B₁ crystals :— Rats fed on the same artificial diet, supplemented daily with 0.001 mg of the synthetic B₁ crystals, were perfectly healthy during 5 weeks and as to the effect on the growth rate, this amount was comparable with 5 mg of the adsorption product, and also with 0.001 mg of oryzanin crystals. With a daily dose of 0.002 mg, young rats maintained the standard

growth, gaining about 8.3 g per week in average for 5 weeks. (Table 2. Chart. 2)

(3) Oryzanin crystals:— When supplemented daily with 0.001 mg of the natural B_1 crystals isolated from rice polishings, rats showed nearly the same growth rate as with 5 mg of the adsorption product. By giving daily 0.002 mg, they maintained the standard growth, gaining about 8.8 g per week in average for 5 weeks and result was comparable with that produced by 10 mg of the adsorption product or by 0.002 mg of the synthetic product. (Table 2. Chart. 3.) Thus we see that the synthetic B_1 crystals has nearly the same activity as the natural B_1 and 0.002 mg of both are approximately equivalent to the standard unit.

(4) The commercial "Injectio Oryzanin Fortior":— It gave also the same result, 0.004 cc (=0.002 mg of the crystals) being required for the standard unit.

Table 2. Comparison of B_1 activity by the rat growth test;

Materials	Dose (mg)	Number of rats	Growth Rate (per week)		
			Average 5 weeks (g)	First week (g)	Fifth week (g)
(1) The Standard Adsorption product	5.0	3	4.1	8.3	2.5
	10.0	6	8.8	10.8	8.6
	15.0	2	9.7	10.8	8.8
(2) The Synthetic B_1 Crystals (Proposed new standard)	0.0010	3	6.0	10.3	5.3
	0.0015	3	7.8	10.0	7.0
	0.0020	4	8.7	10.8	6.2
	0.0025	5	9.5	7.5	9.5
	0.0030	1	13.2	8.0	16.0
(3) Oryzanin Crystals, the natural B_1 isolated from rice polishings	0.0010	3	5.0	10.3	1.5
	0.0015	3	7.0	11.7	4.0
	0.0020	4	8.8	11.4	9.7
	0.0025	4	9.2	9.8	6.0
	0.0030	2	10.5	11.5	9.5
(4) "Injectio Oryzanin Fortior" of Sankyo & Co.	0.003 cc (=0.0015 mg hydrochloride)	4	6.9	9.1	1.8
	0.004 cc (=0.002 mg hydrochloride)	4	10.1	8.6	9.6
	0.005 cc (=0.0025 mg hydrochloride)	2	10.4	13.0	6.3
	0.006 cc (=0.003 mg hydrochloride)	3	11.7	8.0	16.3

(Room temperature.....17~24°C)

(B) The curative "Day-dose" for pigeons.

The curative Day-dose was tested by the method of Kinnersley and Peters⁽¹⁾ and the results are summarised in the following table:—

(1) Kinnersley & Peters: Bioch. J. 19, 820 (1925).

Table 3. Comparison of B₁ activity by the Day-dose.

Pigeon No.	Body-weight initial (g)	Days to B ₁ -deficiency	Body-weight at B ₁ -deficiency (g)	Dose (mg)	Days of cure	Day-dose (mg)
(1) The standard adsorption product (orally);						
1) 904	294	27	220	75.0	6	12.5
2) 918	335	11	267	75.0	6	12.5
3) 955	342	27	204	75.0	7	10.7
4) 956(2)	382	32	220	75.0	6	12.5
5) 406	305	32	208	50.0	7	7.2
6) 908(1)	285	22	192	50.0	4	12.5
7) 919	305	18	173	50.0	5	10.0
8) 956(1)	382	27	214	50.0	5	10.0
Average day dose						10.90
(2) The synthetic vitamin B ₁ crystals (by injection.);						
1) 901	282	16	179	0.01	2.5	0.004
2) 916	310	28	205	0.01	6	0.0016
3) 908(2)	285	26	190	0.01	3	0.0033
4) 909(1)	325	19	216	0.01	5	0.002
5) 909(2)	325	24	169	0.01	3	0.0033
6) 915	312	18	207	0.01	4	0.0025
7) 920	290	28	198	0.01	5	0.002
8) 922	290	18	204	0.01	3	0.0033
9) 936	324	23	217	0.01	4	0.0025
10) 940(2)	300	24	225	0.01	4	0.0025
11) 933(1)	310	18	239	0.008	3	0.0026
12) 933(2)	310	21	220	0.008	3	0.0026
13) 907	310	36	169	0.008	3	0.0026
14) 927(1)	345	31	196	0.008	5	0.0016
15) 927(2)	345	36	160	0.008	5	0.0016
16) 929	320	19	252	0.008	2	0.004
17) 934	306	21	227	0.008	4	0.002
18) 936(1)	324	19	237	0.008	4	0.002
Average day dose						0.0026
(3) Oryzanin crystals, the natural B ₁ (by injection);						
1) 911	330	19	269	0.01	5	0.002
2) 922(2)	290	21	192	0.01	4	0.0025
3) 948(2)	330	21	190	0.01	3	0.0033
4) 953	302	15	214	0.01	3	0.0033
5) 935(1)	308	16	229	0.009	5	0.0018
6) 935(2)	308	21	180	0.008	4	0.002
7) 945(1)	334	18	230	0.008	4	0.002
8) 945(2)	334	22	218	0.008	3	0.0026
9) 946	349	12	242	0.008	3.5	0.0023
10) 948(1)	330	17	218	0.008	4	0.002
Average day dose						0.0024
(4) "Injectio Oryzanin Fortior" of Sankyo & Co. (by injection);						
1) 954	320	22	218	0.02 cc (0.01 mg)	4	0.005 cc (0.0025 mg)
2) 951	358	32	208	0.02 cc (0.01 mg)	5	0.004 cc (0.002 mg)
3) 947	353	32	238	0.02 cc (0.01 mg)	5	0.004 cc (0.002 mg)
4) 944(1)	343	14	267	0.016 cc (0.008 mg)	3	0.0052 cc (0.0026 mg)
5) 944(2)	343	17	250	0.016 cc (0.008 mg)	3	0.0052 cc (0.0026 mg)
6) 952	300	17	234	0.016 cc (0.008 mg)	3	0.0052 cc (0.0026 mg)
7) 949	347	19	243	0.016 cc (0.008 mg)	3.5	0.0046 cc (0.0023 mg)
Average day dose						0.0045 cc (0.0024 mg)

From the above results, it was observed that the synthetic B_1 crystals possess nearly the same activity as the natural B_1 crystals isolated from rice polishings and 0.0023 mg of it is equivalent to the standard unit.

(C) The curative test for pigeons.

The curative daily dose was tested by the known technique on pigeons fed on the standard artificial diet, deficient in B_1 , consisting of 60% of purified starch, 20% of purified casein, 15% of arachis oil, 5% of McCollums salt mixture No. 185, supplemented daily with 3 drops of cod liver oil and 0.4 g of autoclaved yeast, and the results were compared with that of the standard product.

(1) The standard adsorption product:— When pigeons were fed on the artificial diet mentioned above, they developed severe symptoms of B_1 deficiency usually in 4–5 weeks. By giving daily 20 mg of the adsorption product orally for a week, pigeons were cured completely in 1 day and the weight increased gradually to the last 7th day, while daily doses of 10 mg or 15 mg were found to be insufficient. (Table 4. Chart 5)

(2) The synthetic B_1 crystals:— By the subcutaneous injection in a daily dose of 0.004 mg, pigeons suffering from B_1 deficiency were cured perfectly in a day and their weight increased gradually toward the end of the experiment. (Table 4. Chart 6)

(3) Oryzanin crystals:— Pigeons suffering from B_1 deficiency on the artificial diet mentioned above, were perfectly cured in a day by the subcutaneous injection in a daily dose of 0.004 mg and increased in weight to the last 7th day. A daily dose of 0.005 mg gave still better results. (Table 4. Chart 7)

(4) Injectio Oryzanin Fortior:— The activity of the preparation was tested by injection in daily doses of 0.006 cc (=0.003 mg), 0.007 cc (=0.0035 mg), 0.008 cc (=0.004 mg) and 0.01 cc (=0.005 mg of the crystalline hydrochloride), respectively, on pigeons suffering from B_1 deficiency by feeding on the artificial diet, and 0.008 cc was proved to be the curative daily dose. (Table 4. Chart 8)

Table 4. B_1 activity by the curative test for pigeons.

Dose (mg)	Number of pigeons	Weight initial (g)	Days to B_1 - deficiency	Weight at B_1 - deficiency (g)	Cured in days	Weight last 7th day (g)	Days to B_1 - deficiency	Weight at next B_1 - deficiency (g)
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(1) The standard adsorption product (by oral administration);

10.0	3	362	26	247	not cured	232	2	213*
15.0	2	383	28	256	3 days	250	5	231
20.0	1	373	27	260	1 "	280	7	246
30.0	1	395	28	291	1/2 "	332	7	299

(2) The synthetic B_1 crystals (by injection);

0.002	2	396	27	245	not cured, died after 5 days.			
0.0025	3	392	31	238	not cured	244	4	224*
0.003	3	376	35	309	1 day	285	2	282
0.0035	3	371	32	273	4 hrs.	289	2	270
0.004	3	343	32	272	3 "	294	5	274

(3) Oryzanin crystals, the natural B₁ (by injection);

0.0025	3	371	29	278	not cured	285	2	264*
0.0035	3	317	31	240	1/2 day	268	7	254
0.004	2	376	32	280	3 hrs	298	3	273
0.005	3	356	28	262	3 ..	279	5	250

(4) "Injectio Oryzanin Fortior" of Sankyo & Co. (by injection);

0.006 cc (=0.003 mg, hydrochloride)	3	316	30	227	1 day	239	4	222
0.007 cc (=0.0035 mg, hydrochloride)	2	348	32	256	1/2 ..	279	3	235
0.008 cc (=0.004 mg, hydrochloride)	3	350	29	257	3 hrs	274	3	255
0.01 cc (=0.005 mg, hydrochloride)	2	325	29	255	3 ..	283	7	250

*..... died

SUMMARY.

The above results are summarised in the following table ;

Materials	Rat growth dose (mg)	Pigeon Day-dose (mg)	Pigeon curative dose (mg)	International standard unit (mg)
(1) The standard adsorption product	10.00	11.00	20.00	10.00
(2) The synthetic B ₁ crystals	0.002	0.0026	0.004	0.002 (0.002-0.0024)
(3) Oryzanin, the natural B ₁ crystals	0.002	0.0024	0.004	0.002 (0.002-0.0022)
(4) "Injectio Oryzanin Fortior" of Sankyo & Co.	0.004 cc (=0.002 mg hydrochloride)	0.0048 cc (=0.0024 mg hydrochloride)	0.008 cc (=0.004 mg hydrochloride)	0.004 cc (=0.002 mg hydrochloride)

In the comparison of B₁ activity, it is concluded that the synthetic B₁ crystals which was proposed as a new standard has the same activity as the crystalline Oryzanin isolated from rice-polishings and 0.002 mg is approximately equivalent to the standard unit. For more accurate value, another method for B₁ determination should be studied further.

The authors wish to express their sincere thanks to Prof. U. Suzuki for his kind advice and to Sankyo & Co. for the financial aid to this work. They are also indebted to Messrs. M. Kamada and T. Hayakawa for their kind help in the curative test.

(Tokyo, March 25 th. 1938)

On the Soil Type in Manchuria.

Part I. The brown forest soil in north-eastern Manchuria.

(pp. 599~606)

By R. KAWASHIMA.

(Agricultural Chemical Laboratory, the Kyushu Imperial University,

Received Apr. 7, 1938.)

I. Iyasaka brown forest soil.

Iyasaka is a village settled by Japanese in 1933 and is situated in lat. $46^{\circ} 25'$ N. and long. $130^{\circ} 40'$ E. The arable land is mostly a brown forest soil podzolized only a slight extent, and its parent material is principally sedimentary rocks of paleozoic formation. The data described under, are all expressed in dry basis except pH-value.

The clay fraction in fine soil below 2 mm in diameter is given in table I.

Table I. Clay content.

Layer	A ₁	A ₂	A ₃	B ₁	B ₂
Thickness (cm)	16	16	12	16	40
Clay, <0.01 mm	48.40	48.68	49.97	55.30	56.70
Clay, <0.001 mm	12.90	12.46	15.85	17.43	14.99

As is seen in the table, there is observed some moving down of clay particles in the profile.

Some analytical data on fine soil are given in table II. The exchange capacity and exchangeable calcium are expressed as mg. eq. per 100 g.

Table II. Some analytical data on fine soil.

Layer	Loss on ignition %	Total N.	pH		Daikuhara acidity ($y_1 \times 3$)	Hydroly acidity (y_1)	Exchange capacity	Ex-changeable Ca	% of Ca
			H ₂ O	KCl					
A ₁	10.54	0.33	5.62	4.98	0.4	20.3	26.64	20.14	75.6
A ₂	6.26	0.15	5.38	4.42	1.6	18.8	18.91	12.73	67.3
A ₃	4.84	0.09	5.46	4.32	2.0	16.9	17.47	11.23	64.3
B ₁	4.46	0.06	5.48	4.17	4.5	13.5	19.34	12.65	65.4
B ₂	5.33	0.05	5.48	4.15	5.8	14.1	26.65	17.51	65.7

As in the table II, the pH-values of aqueous suspension and percentage saturation in calcium show a fair uniformity between each layers.

The colloidal clays (<0.001 mm ϕ) were separated and analysed. The total contents of silica and sesquioxides and their molecular ratios are given in table III. In addition, the loss on ignition and exchange capacity are added together.

Table III. Some analytical data on colloidal clay.

Layer	Loss on ignition %	Exchange capacity (m. eq.)	SiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃	$\frac{\text{SiO}_2}{\text{Al}_2\text{O}_3}$	$\frac{\text{SiO}_2}{\text{Fe}_2\text{O}_3}$	$\frac{\text{Fe}_2\text{O}_3}{\text{Al}_2\text{O}_3}$
A ₁	23.60	76.39	36.49	16.44	7.70	3.99	3.07	0.30
A ₂	15.69	63.06	45.84	19.40	8.70	4.01	3.11	0.29
A ₃	14.63	60.76	46.73	19.71	9.23	4.02	3.09	0.30
B ₁	11.49	56.70	46.38	22.85	10.10	3.59	2.80	0.28
B ₂	11.56	58.60	48.44	20.72	10.67	3.96	2.98	0.33

The high loss on ignition and exchange capacity in A_1 are partly attributable on the presence of some humus. The silica-alumina ratio in B_1 is the smallest, and that means some accumulation of sesquioxides in this layer. But as the differences in the magnitude of $\text{SiO}_2/\text{Al}_2\text{O}_3$ and $\text{SiO}_2/\text{R}_2\text{O}_3$ between each layers are insignificant, there can be assumed a fairly good similarity of composition between these colloidal clays.

II. Neian brown forest soil.

Neian is situated about 309 km. southward of Iyasaka, and the parent material of this brown forest soil is basalt. The soils were treated quite similar with the Iyasaka soils, and the analytical results are given in the following tables.

Table I. Clay content.

Layer	Thickness cm	Clay, <0.01 mm %	Clay, <0.001 mm %
A	75	40.54	8.80
B_1	70	42.14	8.78

Table II. Some analytical data on fine soil.

Layer	Loss on ignition %	Total N %	PHI		Daiku- hara acidity ($y_1 \times 3$)	Hydroly acidity (y_1)	Exchange capacity (m. eq.)	Exchange- able Ca (m. eq.)	% of Ca
			H ₂ O	KCl					
A	6.50	0.08	6.78	5.48	0.3	6.6	30.68	23.54	76.7
B_1	6.01	0.03	6.35	4.93	0.6	7.2	31.91	23.66	74.2

Table III. Some analytical data on colloidal clay.

Layer	Loss on ignition %	Exchange capacity (m. eq.)	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	$\frac{\text{SiO}_2}{\text{Al}_2\text{O}_3}$	$\frac{\text{SiO}_2}{\text{Al}_2\text{O}_3}$	$\frac{\text{Fe}_2\text{O}_3}{\text{Al}_2\text{O}_3}$
A	11.62	62.51	48.15	21.70	10.59	3.76	2.87	0.31
B_1	10.45	60.50	48.47	21.24	10.50	3.87	2.94	0.32

The results in above three tables denote that there appear no signs of podzolization in this typically developed Neian brown forest soil. This soil is the same type as Prof. Stremme's brauner Gesteinswaldboden.

Fibre of Flowers of *Typha Latifolia* L.

(pp. 607~608)

By Yoshijiro KIHARA.

(Agricultural Chemical Laboratory, Tokyo Imperial University,

Received Mar. 31, 1938.)

The flowers of *Typha latifolia* L. is a fine smooth fibre having 0.007 mm of

width and 5 mm of the length.

The analysis of fibre was as follows;

Moisture	12.87%	Total soluble carbohydrate	23.38%
Total cellulose	41.45%	Alcohol-benzene extract	1.55%
α -cellulose	69.04%	Ether extractives	1.76%
β -cellulose	14.64%	Total N	0.92%
γ -cellulose	16.32%	Crude protein	5.75%
Pentose	22.11%	Ash	6.87%

The carbohydrate in the fibre consisted of a kind of hemicellulose which could not be extracted with various solvents.

It was hydrolyzed with dilute acid into arabinose. It was identified as benzylphenylhydrazin and phenylosazone. It showed no naphthoresorcin reaction.

When the fibre was digested with 8% NaOH at 160° for 6 hrs., a gray soft pulp was obtained.

The properties of the pulp were as follows;

α -cellulose	83.41	Ash	8.83
β -cellulose	5.64	Copper value (Brady's method)	0.07

It was easily bleached by the bleaching powder and did not give the lignin test.

Studies on the Mucilage from Rhodophyceae.

I. Isolation of the Mucilage from 3 Species of Chondrus.

II. The Chemical Nature of the Mucilage from Chondrus ocellatus Holmes.

(pp. 609~625)

By T. MORI and Y. TUTIYA.

(Laboratory of Chemistry of Marine Products,
Tokyo Imperial University, Received Apr. 7, 1938.)

Chemical Studies on Japanese Coccidae. (XVIII).

Summary of the Reports I—XVII.

(pp. 626~633)

By M. KAWANO and R. MARUYAMA.

(Laboratory of Ohsaka Factory of Sankyo Co. Ltd.,
Received Mar. 17, 1938.)

Untersuchungen über den Abbau von Acetoin durch Mikroben. (3).

Über den Abbau-Mechanismus von Acetoin.

(ss. 634~641)

Von Yukio TOMIYASU.

(Aus dem Agrikulturchemischen Institut der Kaiserlichen Kyushu-Universität,
Eingegangen am 31. 3, 1938.)

Untersuchungen über den Mechanismus von Acetoin-Abbau durch *Bacillus lactis aerogenes* führten zu folgenden Ergebnissen.

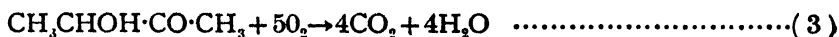
Als Abbauprodukt wurde nur Essigsäure festgestellt. Äthylalkohol sowie Acetaldehyd wurden nicht nachgewiesen. Es wurde weiter bestätigt, dass Äthylalkohol sowie Acetaldehyd durch die ruhenden Bakterien ziemlich schnell verbraucht werden, dagegen nicht die Essigsäure. Als Bildungsweise der Essigsäure aus Acetoin kamen zunächst folgende zwei Möglichkeiten in Betracht:



Es ist klar geworden, dass der Acetoin-Abbau mit dem reinen oxydativen Vorgang nichts zu tun hat, 1. weil der Sauerstoff ohne Einfluss auf den Abbau ist, d.h. der Abbau findet auch glatt im streng anaeroben Zustand statt, 2. weil die Ausbeute des Abbauproduktes zu gering ist. Die Ausbeute an Essigsäure beträgt nach Formel (1) berechnet nur etwa 35% der Theorie, dagegen etwa 70% nach Formel (2). Was die Ursache der geringeren Ausbeute anbelangt, so ergeben sich aus den verschiedenartig angestellten Versuchen folgende Antworten:

Die Ausbeute der Säure wird um so grösser, je kürzer die Kulturdauer ist; die Bakterien atmen das Acetoin sehr leicht; der Acetoin-Abbau wird durch ein Antiseptikum stark verhindert.

Diese Ergebnisse führten mich zu der Schlussfolgerung, dass das Acetoin in der üblichen Kultur am Anfang hauptsächlich nach Formel (3) aerobisch verzehrt wird, solange genügend Sauerstoff im Medium vorhanden ist; und sodann wenn der Sauerstoff spärlich geworden ist, wird das Acetoin nach Formel (2) fermentativ abgebaut. In der Zwischenperiode beider Stadien finden zweierlei, im bestimmten Verhältnis zueinander stehende Abbauvorgänge statt.



Untersuchungen über den Abbau von Acetoin durch Mikroben. (4).

Eine Klassifikation der Bakterien der Coli-Aerogenes Gruppe, unter Berücksichtigung ihrer Fähigkeit des Auf- und Abbaues von Acetoin.

(ss. 642~644)

Von Yukio TOMIYASU

(Aus dem Agrikulturchemischen Institut der Kaiserlichen Kyushu-Universität,
Eingegangen am 31. 3. 1938.)

In beiden vorstehenden Arbeiten habe ich mitgeteilt, dass nur einige Bakterienstämme der Acetoin-produzierenden Aerogenes-Gruppe die Abbau-Fähigkeit des Acetoin besitzen, dass dagegen den Nicht-Acetoinbildnern (Coli-Gruppe) überhaupt diese Fähigkeit fehlt. Um diese Tatsache sicher festzustellen, wurden 297 Bakterienstämme der Coli-Aerogenes Gruppe zu den Versuchen verwendet, wovon 266 Stämme von neuem aus verschiedenen Materialien nach der Vorschrift von Bergey (Manual of Determinative Bacteriology, 1930) isoliert wurden. (Tabelle 1)

Tabelle 1.

Material	Nr. d. Materialien.	Nr. d. isolierten Bakterienstämme.	
		Aerogenes-Gruppe	Coli-Gruppe
Menschen	84	38	139
Rinder	12	1	19
Pferde	4	3	9
Hunde	6	0	6
Kaninchen	18	2	19
Ratten	10	0	14
Boden	16	4	12
	Total	48	218

Das Ergebnis der Versuche war wie folgt. (Tabelle 2)

Tabelle 2.

Probe	Reaktion	Nr. d. Bakterienstämme	
		Aerogenes-Gruppe	Coli-Gruppe
Acetoin-Aufbau	positiv	51	0
	negativ	0	246
Acetoin-Abbau	positiv	15	0
	negativ	36	246
Methylrot	positiv	0	246
	negativ	51	0
Citrat	positiv	50	5
	negativ	1	241
Cellobiose	positiv	49	30
	negativ	2	236

Aus der Tabelle ist ersichtlich, dass die Bakterien der Coli-Gruppe überhaupt keine Auf- und Abbau-Fähigkeit besitzen, während einige von den Bakterien der Aerogenes-Gruppe beide Fähigkeiten, und andere nur die Abbau-Fähigkeit besitzen. Somit dürfte man die Bakterien der Aerogenes-Gruppe auf Grund ihrer Abbau-Fähigkeit von Acetoin noch weiter in zwei Arten klassifizieren, so dass man die Bakterien der Coli-Aerogenes Gruppe nach dem Verhalten gegen Acetoin in folgende drei Arten klassifizieren können wird.

Tabelle 3.

Bakterien	Aufbau-Fähigkeit	Abbau-Fähigkeit	Nr. d. verwendeten Stämme
Aerogenes A (Abbau-Typen)	+	+	15
„ B (Unabbau-Typen)	+	—	36
Coli	—	—	246

Bulletin of the Agricultural Chemical Society of Japan.

TRANSACTIONS

Note on the Determination of Fusel Oil with Vanilline-Sulphuric Acid Reagent.

By Masakazu YAMADA and Katuitiro TAKAKIRI.

The Governmental Institute of Brewing, Takinogawa, Tokyo.

(Received May 28, 1938.)

As to the determination of fusel oil in beverages, Komarowski's colorimetric method with aromatic aldehyde and sulphuric acid has been in use as the simplest and especially Takahasi's method with vanilline in place of original salicylic aldehyde was decided to be the most convenient.

But in this case the care indicated by Bleyer and his coworkers must also be taken, for the color-depths caused by different alcohols are diverse as follows:—

Figures show color-depth.

reagent \ alcohol	iso-propyl	n-propyl	iso-butyl	n-butyl	iso-amyl	Color	
Vanilline + H_2SO_4	0.1	0.1	2.5	0.1	1	red	Yamada
p-Dimethyl aminobenzald. + H_2SO_4	{ — 0.1	0.24 0.1	1.7 1.0	— 0.1	1 1	orange	Bleyer Yamada
p-Oxybenzald. + H_2SO_4	0.05	0.05	2.5	0.05	1	reddish violet	Yamada
Salicylaldehyde + H_2SO_4	—	0.1	3.0	—	1	violet	Bleyer

In all cases the color shows the deepest with isobutylalcohol but quite faint with alcohols of normal type. Fortunately fusel oil consists mainly of isoamylalcohol and so the large error may be avoided when that alcohol is chosen as the control.

Procedure: To 1 cc of distillate add 2 cc of 0.5% vanilline solution in conc. sulphuric acid and shake. Warm in the boiling water-bath for 3 minutes. Add 1 cc of water and shake. Observe reddish violet color developed after half an hour.

Control solution: 1% isoamylalcohol in 15% ethylalcohol.

A New Aging Method of Saké.

By Masakazu YAMADA, Katuitiro TAKAKISHI
and Tokuro TANABÉ.

The Governmental Institute of Brewing, Takinogawa, Tokyo.

(Received May 28, 1938.)

Saké is usually brewed in winter utilizing low temperature and after various treatments of compressing, settling and pasteurization, it is stored for several months and then drunk.

Often want of aged saké in spring should be filled up with fresh saké quickly matured and so a few aging method have been devised. Thus electric current, ozone gas or specially devised vessels with chips of cryptomeria timber were applied, but sure effects have not yet been attained.

Now sugar content in saké indicates minimum at compressing period but then gradually increases until pasteurization. This is due to the action of diastatic enzyme extracted in the fluid, which converts degraded dextrin into sugar. Other enzymes will also be active until this stage, for aging phenomena progresses quite energetically. Increase of sugar is first ceased by pasteurization where heating at 50~55° is prevailed and this fact shows the destruction of diastatic enzyme. It is quite curious that koji-diastrase is destroyed at 45~50° far lower from its optimum temperature 55°, but now it became clear that this was due to the act of alcohol, which existed ordinarily over 15% in saké. So if quick aging is required, it may easily be attained by shortening of settling period with heating. 2~3 weeks at 15~25° instead of usual 35~40 days at 6~10° are the most efficient conditions. Then saké is pasteurized at 50~55°, and kept in cryptomeria barrel only for 2 weeks. Here aged saké is completed.

EXPERIMENTAL.

I. The change of the constituents of saké in various stages of brewing. (Figures show average of 11 samples)

	Sp. gr	alcohol % (Vol.)	total acid %	extract %	sugar %	dextrin %
Compressing	0.9991	17.14	0.1527	5.437	1.136	2.580
Settling stage > ca., 20 days	0.9992	16.74	—	—	1.960	—
Pasteurization > ca., 20 days	0.9994	16.61	0.1450	5.385	2.657	1.239
ca. 2 months after pasteurization	0.9996	16.48	0.1426	5.212	2.698	1.190

II. The destruction of diastatic enzyme by pasteurization.

Figures indicate diastatic power d—the volume of 0.1 percent starch solution

that would be converted to erythrodestrin by 1 cc of the enzyme solution (saké) in 30 minutes.

Each heating for 15 minutes.

saké	before-heating	heating at 30°	heating at 40°	heating at 45°	heating at 47°	heating at 50°
No. 7	10	10	10	2.0	0.071	0
No. 9	6.6	6.6	4.0	0.71	0.083	0
No. 10	2.5	2.2	1.7	0.55	0.055	0

III. The influence of the temperature and alcohol content upon the diastatic power of koji-diastrase.

Enzyme solution: 50 g of koji was extracted with 250 cc of water at 13° for 4 hours and filtered. To the filtrates were added alcohol and water, so as to the resultant solutions contained each 0~30% of alcohol and showed half diastatic activity of original filtrate. Diastatic powers of such enzyme solutions:—

alcohol content of enzyme solution	heated at 52~54° for 15 min.	heated at 52~54° for 6 hours	alcohol content of enzyme solution	heated at 52~54° for 15 min.	heated at 52~54° for 6 hours
0%	6.7	—	20%	2.0	0
5%	6.7	6.7	30%	1.0	0
10%	6.7	3.0	0%	6.7 (not heated)	—
15%	4.0	0			

IV. Experiment of quick aging.

Samples of saké were stored in bottles at designed temperatures and sugar contents were determined.

Saké	storage temp.	the 1st day	after 10 days	after 20 days	after 30 days
A	22°	3.07%	3.61%	4.21%	—%
	15°	3.07	3.26	4.03	4.11
	6°	3.07	3.14	3.59	3.66
B	22°	1.65	2.86	3.40	3.53
	15°	1.65	2.24	2.70	2.84
	6°	1.65	1.99	2.30	2.56
C	22°	2.82	4.17	4.25	4.41
	15°	2.82	3.83	4.08	4.13
	6°	2.82	3.31	3.60	3.71

On an Irritant Smell of Saké changed in Quality.

By Masakazu YAMADA and Taïuo URANO.

The Governmental Institute of Brewing, Takinogawa, Tokyo.

(Received May 28, 1938.)

The barrelled saké often indicates a strong wood-odor of cryptomeria and at the same time irritant smell of acetic acid along with or without odor of ethylacetate. In that case generally the taste becomes sour. Analytical data of such samples are following:—

Saké	Sp. gr.	alcohol	total acid	remarks
A (Unchanged original saké)	0.9966	17.7%	0.1623%	
B (To A was added 20% of water and barrelled.)	1.0035	12.5	0.1770	odor of ethylacetate
C	—	12.5	0.3240	odor of acetic acid and ethylacetate
D	1.0056	12.4	0.2299	odor of acetic acid
E	1.0091	9.2	1.2038	odor of acetic acid and ester

B~E Changed in quality.

All samples contain less than ca. 13% of alcohol and a large quantity of acid, the main part of which being acetic acid. (Usually saké contains 15~18% of alcohol and 0.1~0.2 of total acid.)

Turbidity was not caused by bacteria but some wild yeast (*Willia* sp.) which was able to form ethylacetate.

The same result is often obtained when 5~10% alcohol solution is oxidized with chips of cryptomeria timber. In this case ordinarily acetaldehyde should be produced as an end product while existence of wild yeast brings the reaction farther to acid or ester.

5% alcohol solution with 18 g of cryptomeria timber				10% alcohol solution with 18 g of cryptomeria timber		
	Aldehyde	Total acid as acetic	Remarks	Aldehyde	Total acid as acetic	Remarks
Original solution	0.00157%	0 %		0.00313%	0 %	
After 15 days	0.03118	—		0.00440	—	
" 23 "	0.05019	0.0060	<i>Willia</i> appeared	0.01233	0.3680	<i>Willia</i> appeared
" 41 "		0.0300			0.6608	
" 216 "		0.0826	Odor of ester		2.3674	No bacteria
" 284 "		—			*3.0029	

* Silver salt prepared contained 64.88% of Ag. (Calc. from $C_2H_3O_2Ag$: 64.64%) Consequently, the phenomena comes from too much addition of water to saké and incomplete sterilization of the barrel. The latter cause is easily prevented by washing the barrel with 0.1% of hydrogen-peroxide solution.

On the Destruction of 'Hioti' Smell by Hydrogen Peroxide.

By Masakazu YAMADA and Hisao MATUI.

The Governmental Institute of Brewing, Takinogawa, Tokyo.

(Received May 28, 1938.)

The displeased 'hioti'-smell of putrefied saké is so persistent that it has difficultly been removed by various treatments. Hither-to, the filtration after adding of fresh saké-cake, the adsorption with active carbon or the aeration etc. were practiced but no remarkable effects were attained.

Yukio Tomiyasu found an interesting fact that diacetyl was the main component of 'hioti'-smell and partly succeeded to remove the smell by adding neutralized hydroxylamine-hydrochloride solution to putrefied saké. In that case, the reagent combines diacetyl, forming odorless dimethyl-glyoxime. Lately one of the present authors found that the putrefaction of saké was usually accompanied with the increase of ketones of four carbon atoms. These are diacetyl and especially acetoin.

The contents of such substances vary as follows:—

1. To 3.5 l of saké was added 3 drops of putrefied saké and incubated at 25°.

	Days after incubation	Diacetyl	Acetoin	2,3 butylen-glycol	Remarks
Original sake	1	0.000072%	0.000628%	0.03782%	
Putrefied saké	10	0.000507	0.006556	—	Slightly turbid
"	18	0.000769	0.001389	0.04685	Turbid
"	26	—	0.002013	0.04049	

2. To 5 l of saké was added 10 drops of putrefied saké and incubated at 29°.

Days after inoculation	Total acetoin (Diacetyl and acetoin as acetoin)	Turbidity by bacteria
Original saké	0.000366%	
2 days	0.002654	
4	0.004514	Slightly cloudy
5	0.004697	Cloudy
9	0.006161	Turbid +
10	0.007991	++
11	0.009100	###
12	0.006588	Translucent
13	0.004148	
14	0.004206	
15	0.004575	Diacetyl 0.000942%

Within the present authors' attempts to destroy the displeased smell, hydrogen-peroxide was concluded to be the most efficient and applicable. When man adds one-thousandth part of ca. 35% hydrogen-peroxide solution to putrefied saké and stands for 5~7 days, the indisposed smell may be completely removed.

In the case diacetyl was perceived to have been decomposed to acetic acid as J. Boeseken's report (*Recueil des Travaux Chimiques des Pays-Bas et de la Belgique* Tome 30. 141. 1911.) but no remarkable increase of acid was occurred, because even putrefied saké contained only a minute quantity of diacetyl.

Addendum: If acetoin is added to cold Fehling's solution, reduction of copper preceeds to form the metallic copper (copper mirror).

ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noticed)

**On the Optical Properties of the Fermentation
Lactic Acids. Part VI.**

On some Properties of Racemiasse.

(pp. 645~649)

By Hideo KATAGIRI and Kakuo KITAHARA.

(Agr. Chemical Laboratory, Kyoto Imperial University. Received Apr. 20, 1938.)

It was found that Racemiasse was very sensitive to acid; any racemization was not revealed at $\text{pH}=4$, while the optimum pH value was observed to be 6~8.

Irreversible inactivation of Racemiasse was observed when the resting cells of *L. plantarum* were kept at room temperature, however the aqueous or glycerol suspension of the bacteria could be kept for ten days in an ice chamber, without any noticeable destruction of Racemiasse. The dried bacteria obtained by dehydration on sulphuric acid at $2\sim4^\circ$, revealed remarkable racemization, while Racemiasse was completely destroyed when the bacteria were dehydrated by acetone or alcohol-ether.

Any experimental proof for the nature of Racemiasse observed by Tatum, Peterson and Fred [Biochem. J., 30, 1892 (1936)] who concluded that Racemiasse was composed of a soluble, heat-labile enzyme and of an insoluble, heat-stable coenzyme, was not obtained with *L. plantarum*. The fermented liquid of the bacteria was not revealed any noticeable racemization nor any acceleration for racemization with thoroughly washed bacterial cells.

Any racemization of lactic acid anhydride, ethyl lactate, alanine, phospholactic, mandelic, malic and tartaric acids was never observed by Racemiasse, while selective decomposition of *d*-malic acid was pointed out by *L. plantarum* with which presence of Fumarase was ascertained.

**On the Hydrolytic Decomposition Products of the
Mucilaginous Substance of Yam.**

(Dioscorea Batatas, Decne).

(pp. 650~658)

By **Teizo TAKAHASHI.**

(Agri. College, Gifu, Japan. Received Apr. 18, 1938.)

The mucilaginous sub. of yam was hydrolysed and the following amino acids were isolated.

Glycocoll	—%	Valine	1.04%	Lysine	0.89%
Proline	3.74	Aspartic acid	2.50	*Cystine	1.26
Serine	0.04	Glutamic acid	5.49	*Tryptophane	2.26
Leucine	2.60	Arginine	1.57		
Isoleucine	1.40	Histidine	0.85		

*.....Colorimetric.

Leucine was isolated as *d*, *l*-leucine.

On Yeasts from Apples.

(pp. 659~670)

By **Tosinobu ASAI.**

(Agricultural Chemical Laboratory, Morioka Agricultural College, Japan,
Received Mar. 9, 1938.)

On the Content of 0.2 N HCl Soluble Potash in Tyosen Soils. (I)

(pp. 671~685)

By **Dr. MISU Hideo.**

(Agricultural Experiment Station Government General of Tyosen.)

Chemical Studies on the Fluorescence of the Color in Sake.

(pp. 686~688)

By **Tetutaro TADOKORO, Tuncyuki SAITO and Keizo ITO.**

(Hokkaido Imperial University, Japan. Received Apr. 30, 1938.)

Feeding Experiments with Amino Acid Mixture. I.

Synthesis and Physiological Significance of

α -Amino- β -oxy-Butyric Acid.

(pp. 689~696)

By **Siro MAEDA, Tuneto HIGASHI and Hitosi MATSUOKA.**

(The Institute of Physical and Chemical Research. Received June 30, 1937.)

Chemical Studies on Japanese Coccidae. (XIX)

Nitrogenous and Inorganic Substances of

Tuchandina theae Green et Mann.

(pp. 697~701)

By **M. KAWANO and R. MARUYAMA.**

(Laboratory of Osaka Factory of Sankyo Co. Ltd., Received May 9, 1938.)

On the Inorganic Constituents of Green-Manure Crops. III.

(pp. 702~708)

By K. KONISHI and T. TSUGE.

(College of Agriculture, Kyoto Imperial University. Received May 14, 1938.)

Phosphoric acid contents of nodules and roots, and lime contents of nodules.

The amounts of P_2O_5 and CaO in root nodules from several leguminous crops were determined by measuring microphotometer curves as demonstrated in the authors' paper (Bulletin of the Agr. Chem. Soc. Japan vol. 13, no. 3, 1937). It was evidenced that ashes of roots from alfalfa plant was quantitatively higher in phosphoric acid than those of nodules, while those of nodules from soybean, lupine and serradella were lower than of their roots. The lime contents of nodules from "genge", saatwicken and field pea exceeded those of their roots amounting 10.0, 7.40 and 11.3 per cent respectively.

Either the increased supplies of K_2HPO_4 or $CaCO_3$ to soybean seedling on sand cultures seemed negligible factors affecting the contents of P_2O_5 in ashes of their nodules, but a striking relationship between the Ca content of nodules and the $CaCO_3$ supply.

Blätteralkohol. I. Mitteilung.

Vorkommen von Blätteralkohol im Pflanzenreich.

(ss. 709~716)

Von Sankiti TAKEI, Yajiro SAKATO, Minoru ŌNO und Yosiro KUROIWA.

(Aus. d. Agrikulturchem. Laborat. d. Universität Kyoto. Eingegangen am 25. April, 1938.)

Wie bekannt, riecht das im Pflanzenreich häufig vorkommende Blätteraldehyd (Hexen-2-al-1 oder α , β -Hexenal)⁽¹⁾ beim Verdünnen nach grünem Gras sowie auch nach grünen Blättern. Wir haben nun aus grünen Blättern verschiedener Pflanzen durch Wasserdampfdestillation Blätteröl gewonnen, welchem wir Hexen-3-ol-1 (β , γ -Hexenol) und Hexen-2-al-1 (α , β -Hexenal) als krystallinische Derivate entzogen. Unseren mehrfachen Versuchen zufolge wurde in den Blätterölen ausnahmslos viel mehr Hexen-3-ol-1 als Hexen-2-al-1 festgestellt, zwar bildete ersteres den wichtigsten Bestandteil des grünlichen Geruches. Hiernach mochten wir diesen interessanten pflanzlichen Alkohol von jetzt an bequemlichkeitshalber als "Blätteralkohol" bezeichnen.

Dieser Blätteralkohol kommt im Pflanzenreich fast immer in freiem Zustande vor, als einzige Ausnahme findet er sich gebunden in japanischem Pfefferminzöl in Form von Phenylessigester,⁽²⁾ wo er zwiebelartig riecht. Synthetisch kann man aus Sorbinsäureäthylester durch Bouveaultsche-Reduktion ein Hexen-3-ol-1 ge-

(1) Th. Crutius u. H. Franzen: A. 390, 89~121 (1912); 404, 93~130 (1914).

(2) H. Walbaum: C. 1918 II, 25.

winnen,⁽²⁾ dieses zeigt jedoch gar keinen Geruch von grünen Blättern. Nach unserer Anschauung⁽³⁾ bildet das synth. Hexen-3-ol-1 ein Raum-Isomer von natürl. Blätteralkohol, d. h. das synth. Hexen-3-ol-1 gehört zur *cis*-Form und der Blätteralkohol zur *trans*-Form. Ausser durch den verschiedenen Geruch lassen sich die beiden Hexen-3-ol-1 leicht durch das Merkmal verschiedenen Schmelzpunktes der ihnen entsprechenden Derivate chemisch unterscheiden.

	natürl. Blätteralkohol (<i>trans</i> -Hexen-3-ol-1)	synth. Hexen-3-ol 1 (<i>cis</i> -Hexen-3-ol-1)
4'-Joddiphenylurethan	157°	148°
3,5-Dinitrobenzolat	49°	28°
Phthalestersäures-Silber	126°	118°
Allophanat	146°	143°
Anthrachinon- β -carbonat	68°	50°

Nach unseren Erfahrungen besteht auch eine leichthandliche Methode zur Identifizierung des Blätteralkohols darin, dass man eine kleine Menge Substanz (ca. 0.1 g) mittels Chromtrioxyd in Blätteraldehyd oxydiert und es in gut krystallisierbares 2,4-Dinitrophenylhydrazon (Schmp. 144°) sowie Semicarbazon (Schmp. 173°) überführt.

Auf diese Weise vermochten wir in den grünen Blättern nachstehender Pflanzen Blätteralkohol sowie Blätteraldehyd nachzuweisen:

Tee (*Thea sinensis*), Efeu (*Parthenocissus*), Fallnetz (*Fatsia japonica*), Klee (*Trifolium repens*), Eiche (*Quercus glauca*), Weizen (*Triticum vulgare*), Robinie (*Robinia pseudo-acacia*), Maulbeer (*Morus bombycis*), Rettich (*Raphanus sativus*), *Eurya japonica*, *Pieris japonica*.

Blätteralkohol. II. Mitteilung⁽¹⁾

Einige aus Blätteralkohol synthetisch gewonnene Riechstoffe.

(ss. 717~723)

Von Sankiti TAKEI, Minoru ÔNO, Yosirô KUROIWA,

Tosio TAKAHATA und Tuneo SIMA.

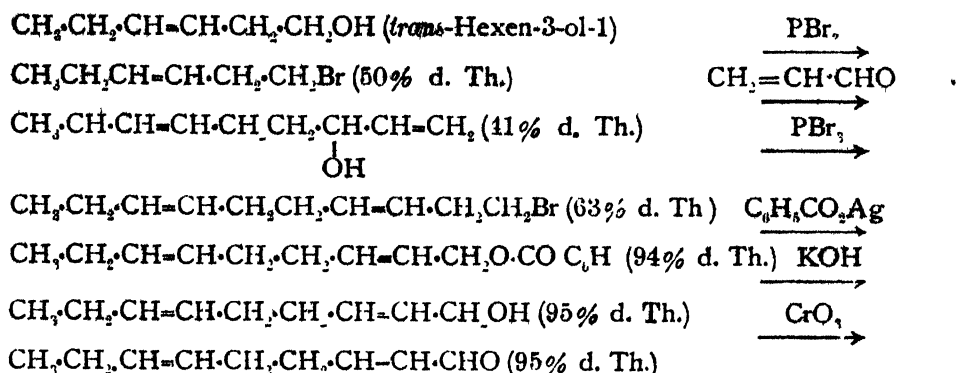
(Aus d. Agrikulturchem. Laborat. d. Universität Kyoto, Eingegangen am 25. April, 1938)

Es ist beachtenswert, dass aus dem im Pflanzenreich viel verbreiteten Blätteralkohol⁽¹⁾ auch chemisch einige wichtige Riechstoffe hergestellt werden konnten. Treff und Werner⁽²⁾ haben aus natürl. Blätteralkohol synthetisch Jasmon gewonnen, das den wichtigsten spezifischen Geruchsbestandteil des Jasminblütenöls ausmacht. Ruzicka und Schinz⁽³⁾ konnten von synth. gewonnenem *cis*-Hexen-3-ol-1⁽¹⁾ — dem Raum-Isomer des Blätteralkohols — ausgehend, das Veilchenblätteraldehyd, nämlich das Nonadien-2,6-al-1, herstellen und seine Identität mit dem aus Veilchenblättern extrahierten Stoff durch Vergleich des Schmelzpunktes beider Semicarbazone (Schmp. 168-168°) konstatieren.

Nach unserer Annahme müssen das natürl. Veilchenblätteraldehyd zum 2-*trans*-6-*trans*-Nonadienal-1 dagegen der von Ruzicka und Schinz künstlich aus

(3) S. Takei, T. Imaki u. Y. Tada: B. 68, 953 (1935).

synth. *cis*-Hexen-3-ol-1 erhaltene Stoff zum 2-*trans*-6-*cis*-Nonadienal-1 gehören^{1, 2}. Geht man aber statt von dem *cis*-Hexen-3-ol-1 von dem Blatteralkohol, dem *trans*-Hexen-3-ol-1 aus, so muss man das 2-*trans*-6-*trans*-Nonadienal-1 erhalten. Auf Grund dieser Überlegung haben wir auf folgende Weise 2-*trans*-6-*trans*-Nonadienal-1, d. h. natürl. Veilchenblatteraldehyd, in guter Ausbeute gewonnen.



Das Endprodukt besitzt einen an den Saft frischer Guken erinnernden Geruch³⁾ und ergibt leicht Semicarbazon (Schmp. 157.5°) sowie 2,4-Dinitrophenylhydrazon (Schmp. 113°).

Nonadien-1,6-ol-3 und Nonadien-2,6-ol-1, die Zwischenprodukte bei dieser Synthese, riechen nach Zypressenblättern bzw. nach Seegurken. Das aus Onanthol und Äthyljodid erhaltene Nonanol-3 zeigt einen eigentümlichen Holzgeruch oder den Japanlack-Geruch. Die Schmelzpunkte der krystall. Derivate dieser C₉-Alkohol sind:

	4'-Joddiphenylurethan	Allophanat
Nonadien-1,6-ol-3	122°	125°
Nonadien-2,6-ol-1	137°	140°
Nonen-6-ol-3	110°	96°
Nonanol-3	146°	135°

- (1) I. Mitteilung: J. Agr. Chem. Soc., **14**, 709 (1938).
- (2) W. Treff und H. Werner: B., **88**, 640 (1935).
- (3) L. Ruzicka u. H. Schinz: Helv, **16**, 1592, 1602 (1934).
- (4) vergl. B. Greby: C., **1937** I, 1405.
- (5) E. Späth u. Kessler: C., **67**, 1499 (1934).

Untersuchungen über die Herstellungs-Methode des Bagasse-Zellstoffes.

- (1). Über den Bagasse-Zellstoff nach dem Natronverfahren. •
(ss. 724~732)

Von Syosuke TANAKA und Muneo KOORIYAMA.

(The Department of Industry, Government Research Institute, Taiwan, Japan,
Eingegangen am 21. Apr. 1938.)

**The Chemical Constituents of Actinidia Callosa
Lindl. var. Rufa Makino. II.**

(pp. 733~736)

By Yoshijiro KIHARA.

(Agr. Chem. Lab., Tokyo Imperial University, Received Apr. 20, 1936.)

The mucilage of the bark of *Actinidia callosa* Lindl. var. *rufa* Makino was purified by precipitating with Fehling's solution. The powder of the mucilage decomposed at 224°C. $[\alpha]_D^{20} = +15.1^\circ$. The ratio of the quantities of galactose and arabinose was 4.5:1. Hence the mucilage may be a kind of arabogalactan consisting of 3 molecules of galactose and 1 molecule of arabinose.

Acetyl derivative of arabogalactan was prepared. It was a white amorphous powder, soluble in hot methyl alcohol and chloroform. The melting point was 216°C. $[\alpha]_D^{25} = -34.34^\circ$ (3.058% chloroform solution).

It was hydrolyzed by Eulota extract but no hydrolyzing enzyme could be found in Takadiastase and the extract of *Turbo cornutus* Solander.

The solution of the arabogalactan was hydrophobe. The capillary action of the dilute solution was estimated by the penetration velocity through filter paper.

Glucomannan of *Narcissus tazetta* and the mucilage of *Abelmoschus manihot* were also hydrophobe as well as the arabogalactan, while soluble starch was hydrophilic. Three % solution of the arabogalactan was a viscous jelly. The viscosity decreased rapidly when it was diluted to 2%.

The insoluble pentosan of the bark had previously reported as *Nashikazura araban*. It was hydrolyzed by boiling with 1% H_2SO_4 for 4 hours. The hydrolysate was neutralized with $BaCO_3$ and then $BaSO_4$ precipitated was removed by the filtration. The filtrate was concentrated under diminished pressure and an equal volume of alcohol was added. A white precipitate of Ba compound was obtained. It gave a remarkable uronic acid reaction with naphthoresorcin.

The quantity of uronic acid was estimated by the Dickson, Otterson and Link's method.

The molecular ratio of arabinose and hexuronic acid was 4:3. The *Nashikazura araban* may be a kind of polysaccharide consisting of 4 molecules of arabinose and 3 molecules of hexuronic acid. It was precipitated from the aqueous solution with $Ba(OH)_2$, $CuSO_4$ and Fehling's soln. The aqueous solution was acidic and dextro-rotatory.

The alcohol soluble carbohydrates of the fruits of *Actinidia callosa* Lindl. consisted of reducing sugar only. The solution of reducing sugar showed $[\alpha]_D^{20} = -35.3^\circ$. It gave glucosazone and Seliwanoff reaction. It may be inverted from sucrose during the sampling.

The cold water soluble carbohydrates of the fruits was precipitated by the addition of alcohol.

It was a kind of polysaccharide consisting of 1 molecule of hexose and 1 molecule of pentose.

The solution was precipitated by CuSO_4 and Fehling's solution, but Ba(OH)_2 . A phenylisazone melting at 185°C was prepared from the hydrolysate.

The hot water soluble fraction of the fruits showed the reaction of pectin.

On the Soil Type in Manchuria (Part II).

The Brown Forest Soil in Koroto.

The Basic Reddish Soil in Yohakuji.

(pp. 737~742)

By R. KAWASHIMA.

(Agr. Chem. Laboratory, Kyushu Imperial University, Received Apr. 27, 1938.)

I. Koroto

Koroto is situated on the coast of Ryoto bay nearly in lat. 41°N . and long. 121°E . The parent material of soil consists of clay slate of cambro-ordovician. The nature of fine soil is expressed in table I.

Table I. The nature of fine soil.

Layer	Thick- ness cm	Clav ($<10\mu$) %	Clay ($<1\mu$) %	N %	pH		Daiku- hara acidity ($y_1 \times 3$)	Hydroly. acidity (y_1)	Ex- change capacity (m. eq.)	Ex- change- able Ca. (m. eq.)	% of Ca
					H_2O	KCl					
	35	24.37	6.70	0.08	6.63	5.32	0.4	4.6	8.42	5.74	68.2
	50	48.69	28.03	0.05	5.00	3.78	56.3	21.8	18.03	2.76	15.3

As in the table, translocation of clay particles from the surface layer are demonstrated. The small content of nitrogen indicates the scarcity of humus. The weakness of acid reaction and fairly high calcium saturation in A-layer is due to the influence of herbaceous vegetation after the loss of forest. The acid reaction in B-layer is much more stronger than A, and its exchange complex is exceedingly deficient in lime.

The colloidal clay below 1μ in diameter were separated and analysed. The analytical data are as follows.

Table II. The composition of colloidal clay.

Layer	Exchange capacity (m. eq.)	Loss on ignition %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	$\frac{\text{SiO}_2}{\text{Al}_2\text{O}_3}$	$\frac{\text{SiO}_2}{\text{R}_2\text{O}_3}$	$\frac{\text{Fe}_2\text{O}_3}{\text{Al}_2\text{O}_3}$
A	41.76	14.49	45.40	21.19	9.82	3.63	2.80	0.30
B	45.52	11.56	45.42	23.15	11.37	3.33	2.53	0.31

As in table II, there is observed a slight accumulation of sesquioxides in colloidal clay of B-layer. It is regarded that this brown forest soil wear in some measure an aspect of reddish acid soil type in wet and hot climate.

II. Yohakuji

Yohakuji is situated about 150 km distant to north-west from Koroto. The parent material of soil consists of gneiss. The soil reacts basic and effervesces strongly on addition of acid. Although there remain in profile some clear morphological characteristics as brown forest soil, it changed secondarily to such basic and calcareous state, owing to the influence of deforestation in remote past. The climatical data are not available, but it is certain that the evaporation is much greater than the precipitation. The nature of soil are indicated in following two analytical results.

Table III. The properties of fine soil.

Layer	Thick-ness (cm)	Clay ($<10\mu$) %	Clay ($<1\mu$) %	N %	pH		Water soluble		Exchange capacity (m. eq.)
					H ₂ O	KCl	Cl %	SO ₄ %	
A	40	26.01	5.20	0.07	8.23	7.48	0.276	0	15.49
B ₁	70	35.24	11.36	0.05	8.14	7.29	0.149	0	17.00
B ₂	60	33.71	8.12	0.04	8.04	7.17	0.236	0	21.14

Table IV. The composition of colloidal clay.

Layer	Exchange capacity (m. eq.)	Loss on ignition %	SiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	SiO ₂	SiO ₂	Fe ₂ O ₃
						Al ₂ O ₃	R ₂ O ₃	Al ₂ O ₃
A	52.12	18.64	37.47	15.34	8.43	4.14	3.06	0.35
B ₁	57.04	14.08	42.12	23.58	9.73	3.03	2.39	0.46
B ₂	56.13	13.54	42.53	19.84	10.88	3.63	2.69	0.35

Some New Ingredients of Brown Algae*, VII.

On the unsaponifiable Liquid Part of the Algae Fats.

(pp. 743~748)

By K. SHIRAHAMA.

(Hokkaido Imperial University, Received May 1, 1938.)

A liquid part obtained from *Alaria crassifolia* Kjellm. after excluding pelvesterol, was separated to three fractions by solvents.

I. 80% methanol soluble fraction (19% of the total liquid substance) had a narcotic action and activates the action of lipase as already reported. Its distilled part (120~140°C, 3 mm) had distinctly stronger actions, and (Iodine value 147) produced a small amount of crystall (m.p. 149°C) having the empirical formula C₇H₁₀O₂, but showed physiological actions above mentioned.

II. 90% methanol soluble substance (31% of the total liquid substance) contains vitamine A, and

III. Petroleum ether soluble substance (50% of the total liquid) has chiefly composed of hydrocarbon C₁₈H₃₆ and several others such as C₂₀H₄₀, C₂₁H₄₀ and higher unsaturated terpenes, but contained no squarene.

* This subject is continued from preceding reports entitled "On the Unsaponifiable Matter of the Algae Fats."

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS

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(Pages refer to the Japanese originals of this volume unless otherwise noticed)

Feeding Experiments with Amino Acid Mixture (II).

On the Nutritive Value of Alanine.

(pp. 749~751)

By Siro MAEDA, Tuneto HIGASHI and Hitosi MATUOKA.

(The Institute of Physical and Chemical Reserch, Received June 30, 1937.)

Studies on the Enzymes of Lactic Acid Bacteria. (Part I).

On Fumarase of Lactic Acid Bacteria.

(pp. 752~756)

By Kakuo KITAHARA and Hideo KATAGIRI.

(Department of Agriculture, Kyoto Imperial University.

Received May 26, 1938.)

In the previous paper [This Journal 14, 645 (1938)], the authors found fumarase in *Lactobacillus plantarum*. In the present paper, experiments were carried out with dried cells of various kinds of lactic acid bacteria, in order to ascertain the occurrence of fumarase in these cells.

The presence of fumarase was verified with *L. plantarum*, *L. pentoaceticus*, *L. brevis* and *L. casei*, while fumarase was not detected in the cells of *L. Sake*, *Streptoc. lactis* and *Leuc. mesenteroides* var. *Sake*.

The occurrence of fumarase did not coincide with the known natures of the bacteria: forms of the cells, manners of decomposition of glucose, optical properties of lactic acid being produced or the occurrence of racemase. Therefore, detection of fumarase would be useful for the classification of lactic acid bacteria.

Only *l*-component of malic acid was dehydrated by the fumarase of these bacterial cells when *dl*-acid was chosen for the substrate.

With various kinds of bacterial cells, the equilibrium quotient $Q = l\text{-malate}/\text{fumarate}$, was always found to be 3.3 at 30° C and in pH = 7.4, although the

velocity of the reversible reaction between *l*-malate and fumarate was varied noticeably with the kinds of bacteria.

Synthesis and Hofmann's Decomposition of Certain Alkaloids of Aporphine Type (Derivatives of Domesticine).

(pp. 757~778)

By Hideo SHISHIDO.

(Chemical Laboratory, Kitasato Institute, Received May 16, 1938.)

Studies on the Action of Arginase on Canavanin and Arginine II.

The Marked Difference of the Influence of Manganese Salt and Ferrous Salt upon the Action of Arginase on Canavanin and Arginine.

(pp. 779~790)

By Matsunosuke KITAGAWA and Tsuneki WATANABE.

(Biochemical Laboratory, Department of Agriculture, Kyushu Imperial University, Fukuoka,

Received May 23, 1938.)

On the Acidity and Exchangeable Lime Content of Good Tea Farm Soil in Japan.

(pp. 791~798)

By R. KAWASHIMA.

(Agr. Chemical Laboratory, The Kyushu Imp University, Received May 28, 1938.)

Twenty five surface- and nine subsoils of good tea farms of different geological origin in Japan were collected and their acidity and exchangeable lime were determined. According to this examination, the seventy percent of surface soils collected have the pH-value higher than 5.0 and the sixty percent of them have the exchangeable lime content of less than 0.1%. It is a noticeable fact that the tea plant makes a good growth on such an acid mineral soil deficient in exchangeable lime as:— pH 3.74, Daikuhara acidity 165.4, hydrolytic acidity 64.3, and exchangeable lime 0.040%. The analytical data of air-dried fine soils are summarized as follows:

The acidity and exchangeable lime content

		pH		Daikuhara acidity ($y_1 \times 3$)	Hydrolytic acidity (y_1)	Exchangeable lime %
		H ₂ O	KCl			
Surface soil	Max.	5.96	5.18	165.4	64.3	0.016
	Min.	3.74	3.25	0.4	15.5	0.269
	Ave.	5.07	4.33	31.4	34.9	0.089
Subsoil	Max.	6.97	5.75	173.6	62.8	0.011
	Min.	3.71	3.22	0.4	4.5	0.209
	Ave.	5.53	4.67	29.4	19.7	0.089

Influence of Three Essential Elements (N. P. K) on the Yield and Quality of the Cucumber.

(pp. 799~804)

By Chikafumi ICHIKAWA.

(The Soma Agricultural and Sericultural School. Received May 19, 1938.)

On the Content of 0.2 N HCl Soluble Potash in Tyosen Soils. (II).

(pp. 805~823)

By Dr. MISU Hidco.

(Agricultural Experiment Station Government General of Tyosen,

Received Apr. 21, 1938.)

Comparative Studies on the Strains of Wine Yeast, indigenous to Japan and other Countries, for Wine Making.

(pp. 824~828)

By Tatuitiro INOUE.

(Agricultural Chemical Laboratory, Faculty of Agriculture,
Imperial University of Tokyo. Received June 7, 1938.)

On the Koji-Amylase.

Part X.—On the Behaviours of α -, β -amylases and of Maltase to various external Conditions.

(pp. 829~838)

By Yuzo TOKUOKA.

(Tsunekichi Okura Brewery. Received May 24, 1938.)

α -Amylase of koji (*Asp. oryzae* grown on steamed rice) was totally destroyed by the following treatments, therefore the liquids being contained β -amylase and maltase were easily prepared:

(1) The aqueous extract of koji was precipitated by alcohol. The aqueous solution of the precipitate was adjusted to pH=2.5 and then kept for 30 minutes at 40°.

(2) The aqueous solution was adjusted to pH=4.5 and kept for 24 hours at 40°

(3) The aqueous solution was adjusted to pH=6.1 and kept for 30 minutes at 80°.

Among these treatments, only the 3rd method was found to be not applicable for commercial Taka-diatase preparations.

The optimum and the ranges of pH value of α -, β -amylases and of maltase

for the decomposition of the substrates were found to be 5.1~5.5 (2.5~9.5), 4.5~5.0 (ca. 1.5~10.0) and 3.2~4.1 (ca. 1.5~9.5) respectively.

As was shown in the treatments above mentioned, α -amylase was found to be very sensitive to both acid and temperature. The optimum and the ranges of pH values for the stability of the enzymes were observed to be different.

(i) When the enzyme solution was kept for 20 hours at 40°, the optimum pH values of α - and β -amylases for the stability were determined to be 7.0~7.5 and 5.2~6.6. For maltase, the pH values were found to be very much the same as β -amylase.

(ii) When the enzyme solution was kept for 30 minutes at 40°, α -amylase was remarkably inactivated at any pH value between 2.5~11.0, while β -amylase was at last destroyed at such higher alkalinity as pH=12.0.

It is very remarkable that β -amylase was very stable to acid, since its activity was still remained partly, in its 0.5 *N* HCl solution treated as was mentioned above. Maltase again revealed very much the same behaviour to acid and alkali as was observed with β -amylase, but the former was appeared to be slightly inferior to the latter.

(iii) When the enzymes were compared at their optimum pH values for stability, α -amylase was completely destroyed by heating at 70° for 30 minutes, while β -amylase and maltase could fairly resisted for boiling (100°) for 30 minutes.

On the Koji-Amylase.

Part XI.—Effect of Koji-materials on the Production of Amylases and Maltase.

(pp. 839~842)

. By Yuzo TOKUOKA.

(Tsunekichi Okura Brewery. Received May 24, 1938.)

For Koji-materials, polished rice, soy-bean, rice- and wheat brans were chosen. The same strain of *Asp. oryzae* was grown on these various materials.

With distilled water, amylases and maltase were easily extracted from all the koji-preparations, while the extraction of α -amylase in plished rice-koji preparation was found to be greatly limited unless salt solution was employed instead of water, as was already pointed out in the previous paper.

When the amounts of β -amylase and maltase were compared with the amount of α -amylase, the ratio was, in each case, found to be about 10 times higher with polished rice-koji than the other koji-preparations and taka-diastrase.

This remarkable difference would be several times diverged when aqueous extracts were chosen for comparison.

The characteristic nature of polished rice-koji being contained comparatively small amount of α -amylase, was suggested to be suitable for preparing of koji and for the process of Sake-manufacture.

Effect of Salts in Water for the Silk-Reeling on the Colour and Lustre of Raw Silk.

Part I.—On the Salts in Waters for Cooking and Reeling of Cocoons.

(pp. 843~848)

By Tosio NAKAHAMA and Shun-iti NISIMURA.

(Laboratory of Kanebo Silk Factory, Hikone, Siga. Received June 1, 1938.)

The dilute aqueous solutions of 27 kinds of salts including iron, copper, aluminium, calcium, magnesium, sodium and potassium salts were chosen for the present experiments.

The colour (white, black and colour contents) and the lustre (degree of gloss) of the raw silk reeled with these salt solutions were determined by Pulfrich-photometer.

When very dilute solutions (0.001 or 0.0001%) were used, no remarkable effect on colour of the raw silk was produced by any of these salts.

However, white content of raw silk was found to be decreased remarkably by iron and copper, fairly by aluminium and slightly by calcium salts, when 0.01% aqueous solutions were employed.

It is suggested that the effect of salt on the colour of raw silk would be produced by the adsorption of cations of the raw silk, since the amount of fat and sericin in raw silk did not coincide to the colour of the raw silk.

The degree of gloss of raw silk was observed to be directly proportional to the amount of fat or to the loss of sericin by reeling, but the effect of cations or anions on the lustre was found to be at random.

Effect of Salts in Water for the Silk-Reeling on the Colour and Lustre of Raw Silk.

Part II.—Effect of Salts on the Colour and Lustre of Raw Silk.

(pp. 849~853)

By Tosio NAKAHARA and Shun-iti NISIMURA.

(Laboratory of Kanebo Silk Factory, Hikone, Siga. Received June 1, 1938.)

Raw silk was treated directly in the same manners and with the same kinds of salt solutions as were employed in the previous paper (Part I).

The effect of iron salts on the white content was found to be more remarkable and then copper, aluminium and calcium salts were found respectively to produce nearly the same effects as were observed in the previous paper.

The lustre of raw silk was again observed to be directly proportional to the amount of fat or to the loss of sericin during the treatment, and the effect of salts on the colour of raw silk was suggested to be produced by the adsorption of cations on the raw silk.

Alcohol Manufacture from Potatoes (V).

Preliminary Treatments of Potatoes on Semi-industrial Scale.

(pp. 854~858)

By K. SATOH, K. HAYASHI and A. MATSUMI.

(Institute of Hokkaido Industrial Experiment Station. Received June 5, 1938.)

Alcohol Manufacture from Potato (VI).

Studies on Pressed Juice (I).

(pp. 859~867)

By T. YOSIMACHI and Y. OTAKU.

(Hokkaido Industrial Experiment Station. Received June 15, 1938.)

Observations of its practical yields from potato, discussions upon the quantities of its utilizable constituents and experiments on its behaviour especially concerning pH migration when mixed with acid-sugar mash filtrate, shows the fact that the pressed juice of potato, either raw or boiled, possessing a significant value as the supplemental source of fermentative substances and also as an excellent adjuster for the mash-pH, must be managed carefully in its preparation and be added back to the mash before the fermentations.

Alcohol Manufacture from Potato. (VII).

Acclimatization of Yeast in Acid-sugar Mash.

(pp. 868~872)

By T. YOSIMACHI.

(Hokkaido Industrial Experiment Station. Received June 15, 1938.)

Not only its type of preparation is characteristic but also as a substance which was not yet intimated with ordinary cultured-yeast, it is rather presumable that the acid-sugar mash must never be an easily fermentable material. Experiments also showing the similar results, the selection of a befitting mother yeast comes in necessity as the fundamental problem of this fermentation.

The acclimation, starting from Sacch. Thermantitonus 792, in the acid-sugar mash filtrate under the addition (9~vol%) of rice bran extracts, was elaborated in 2 series each of 25 generations. The steadious progress of yeast condition was recorded. In final stage the fermentation period was reduced somewhat to 46 hrs. (the time contraction corresponding 1/2 of the initial stage or 1/3 of the original culture), and the application of this mother culture enabled the performance of each fermentation also in semi-industrial scale.

A Study in the Mannitol-Forming Bacteria.

By Shin-ichiro BABA.

(pp. 873~894)

(Agricultural Chemical Laboratory, Tokyo Imp. Univ. Received May 28, 1938.)

The writer isolated thirty varieties of the mannitol-forming bacteria from fruits, various dried goods, milk and its manufactured articles, pulses, cereals and vegetables, and proceeded to investigate their morphological and physiological properties to determine their positions in the taxonomy. Moreover, the writer made clear various culture-conditions for production of mannitol, with respect to the much mannitol-forming bacteria and tried to produce mannitol from the Jerusalem artichoke. The outline of the investigation runs as follows.

(1) The bacteria were isolated from as various kinds of materials as possible: fruits (bananas, apples, persimmons, pomegranates, pears, strawberries, grapes etc.), dried goods (dried pieces of sweet potatoes, dried fishes, dried tangles, dried mushrooms etc.), milk and its manufactured articles (butter, cheese etc.), pulses, cereals (wheat, barley, green malt, rye etc.) and vegetables (potatoes, tomatoes etc.). According to the writer's experiment, the mannitol-forming bacteria are distributed most plentifully in fruits generally, and then in milk, dried goods etc. So it is better chosen to take the fruits in general for the origin of these bacteria by cultivating them at about 30°C.

(2) The classification of the separated bacteria was made after the Orla-Jensen's classification. They are determined to belong to Pseudo-lactic acid bacteria or True-lactic acid bacteria, according to their having abilities of decomposing H_2O_2 and reducing nitrate or not. And moreover, their positions in the classification are also determined according to their morphological and physiological properties.

A) True-lactic acid bacteria

(a) *Streptobacterium plantarum* varieties

B_3 , B_6 , R_1 , IA_1 , AN_1^o

(b) *Betabacterium breve* varieties

I_1 , B_4 , AN_4^o

(c) *Betabacterium caucasicum* varieties

Z_3 , KA_3^o

(d) *Betacoccus arabinaceus* variety

B_5

B) Pseudo-lactic acid bacteria

(a) *Microbacterium lacticum* varieties

B_1 , B_2 , R_2 , PM_3 .

(3) The relation between the separated bacteria and their mannitol forming abilities runs as follows:

Mannit Sugar consumed $\times 100$	10~30%	30~40%	40~50%	50~60%	Total
<i>Streptobacterium plantarum</i> var.	2 strains	1 strain	1 strain	1 strain	5 strains
<i>Betabacterium breve</i> var.		2 strains	1 strain		3 strains
<i>Betabacterium caucasicum</i> var.	1 strain	1 strain			2 strains
<i>Betacoccus arabinaceus</i> var.			1 strain		1 strain
<i>Microbacterium lacticum</i> var.	2 strains	1 strain	1 strain		4 strains

Judging from the above result, the order of mannitol-forming ability is as follows :

- (i) *Streptobacterium plantarum* variety.
- (ii) *Betabacterium breve* variety.
- (iii) *Betacoccus arabinaceus* variety.
- (iv) *Microbacterium lacticum* variety.
- (v) *Betabacterium caucasicum* variety.

(4) The quantitative relation between mannitol and total acids is represented by the next equation.

$$y = -0.403x + 3.165,$$

where x is the weight (g) of mannitol and y (g) total acids as lactic acid.

As the result of calculation, the probability of applying the equation for mannitol and total acids is 60 per-cent, and the probable error is ± 0.120 . Quoting the above formula, the total acids are approximately guessed from mannitol.

(5) Among these bacteria, IA_3 and B_1 , which produce a great deal of mannitol, have the optimum pH=6.6~6.8 for the fermentation.

(6) For the same bacteria, the optimum concentration of sugar in mash is 8~11%.

(7) In the range of pH=4.4~7.0, the lower is the value of pH, the shorter become the days necessary for the production of maximum quantity of mannitol. The days necessary for fermentation are unlike owing to the species of bacteria and their culture-conditions. When pH is 6.8 and the concentration of sugar is 11%, 6~9 days are necessary for production of maximum quantity of mannitol.

(8) The quantity of mannitol produced in the mixed culture media of two species of bacteria is less than that produced by the bacterium of the two, which produces much more mannitol, and more than that by the other.

(9) About 3% mannitol was produced in the saccharified solution of Jerusalem artichoke. 60 g of mannitol were got from 2 kg of the raw materials.

Experimentelle Untersuchung über die Wirkung von Radium und Röntgen-Strahlen auf die Gärungsmikroorganismen (I Mitt.)

Auf die morphologischen und biochemischen Eigenschaften
der Radium-Rassen des *Aspergillus niger*.

(ss. 895~910)

4

Von R. NAKAZAWA und M. SIMO.

(The Department of Industry, Government Research Institute,
Taiwan, Japan. Received June 4, 1938.)

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noticed)

Action of a Green Fluorescent Substance like Acetylflavin on Plants and Animals. (Part III).

(pp. 911~913)

By Tetutaro TADOKORO and Keizo ITÔ.

(Hokkaido Imperial University, Received June 13, 1938)

Feeding Experiments with Rice Proteins.

(pp. 914~922)

By Siro MAEDA, Tuneto HIGASHI and Hitosi MATSUKA.

(The Institute of Physical and Chemical Research,

Received June 20, 1937)

On the Content of 0.2 N HCl Soluble Potash in Tyosen Soils. (III).

(pp. 923~941)

By Dr. MISTU Hideo.

(Agricultural Experiment Station Government General of Tyosen,

Received Apr. 21, 1938)

Chemical Researches on the Pulp Woods of Manchoukuo.

Part IV. Chemical Analysis and Cooking Experiment of the Hard Woods. ..

(pp. 942~950)

By Masuzo SHIKATA and Tsuneo TATSUNO.

(Kyoto Imperial University, Received June 8, 1938.)

In this paper, the researches on the chemical components, fibre-length, and

cooking experiments of hard woods are given.

The species of the woods employed are shown as follows;

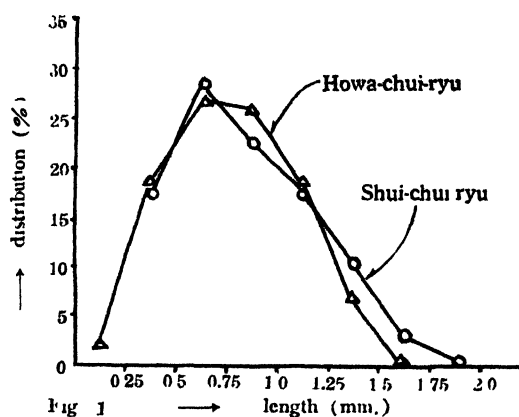
Common name	Japanese name	Scientific name	Annual rings
Shui-chui-ryu	Yachidamo	<i>Fraxinus mandshurica</i> Rupr.	97
Howa-chui-ryu	Oh-toneriko	<i>Fraxinus rhynchophylla</i> Hance	62

1. Physical properties.

The distribution of fibre-lengths is as shown in Table I.

Table I. The Distributions of Fibre-length.

Length (mm)	Sui-chui-ryu	Howa-chui-ryu
0 ~0.25	—	1.6
0.25~0.50	17.50	18.6
0.50~0.75	28.50	27.6
0.75~1.00	22.25	26.4
1.00~1.25	17.75	18.4
1.25~1.50	10.50	7.0
1.50~1.75	3.25	0.2
1.75~2.00	0.25	—
2.00~2.25	—	—



The data given in Table I are graphically shown in Figure 1. These data show that the fibre-lengths of these hard woods are not so long as those of soft woods.

2. Chemical analysis of wood components.

The results of analysis of the chemical components of these woods are given in Table II.

Table II. Chemical Components.

Components	Species	Shui-chui-ryu	Howa-chui-ryu
Ash		0.39	0.22
Water-soluble		3.10	3.99
Hot-water-soluble		4.36	6.60
1% NaOH-soluble		19.93	19.73
Alcohol benzene-soluble		1.72	3.31
Crude cellulose		55.41	53.62
α-cellulose		40.61	39.09
β-cellulose		8.72	10.01
γ-cellulose		6.08	4.52
Pentosan		20.63	18.45
Lignin		23.02	22.94
In crude cellulose			
α-cellulose		73.29	72.90
β-cellulose		15.74	18.48
γ-cellulose		10.97	8.62
Volume weight		0.57	0.63

3. Cooking experiments.

The cooking experiments with the Ca-sulphite process and soda-process were carried out under the conditions given in Table III.

Table III. The Conditions of Cooking Experiments.

Cooking solution	NaOH Na ₂ CO ₃	Soda-process (No. 1)	CaO Total SO ₂	Ca-sulphite process (No. 2)	Ca-sulphite process (No. 3)
		6.45 g/100 cc 0.22		1.0 g/100 cc 3.60	1.0 g/100 cc 3.48
Penetration		110°C 2 hrs 2 kg/cm ²		110°C 2 hrs 3 kg/cm ²	110°C 2 hrs 5 kg/cm ²
Main cooking		165°C 3.5' 6.5		130°±1°C 3.5' 5~5.5'	130°±1°C 5' 6'
Chip (oven dried) / cooking solution					
Shui-chui-ryu		21.11 g/100 cc		14.07 g/100 cc	14.07 g/100 cc
Howa-chui-ryu		21.52		14.35	14.35

The chemical components of unbleached pulps are given in Table IV.

Table IV. The Analysis of Unbleached Pulps.

Component	Wood	No. 1 pulp		No. 2 pulp		No. 3 pulp	
		Shui-chui-ryu	Howa-chui-ryu	Shui-chui-ryu	Howa-chui-ryu	Shui-chui-ryu	Howa-chui-ryu
Ash		0.99%	0.65%	1.20%	1.13%	0.75%	1.02%
α-cellulose		87.09	89.67	83.33	80.10	86.42	83.93
β-cellulose	}	9.69	7.88	5.74	5.58	4.16	6.05
γ-cellulose							
Pentosan		17.22	18.00	8.17	5.83	4.66	6.19
Viscosity (centipoises)		26	44	90	88	31	43
Copper number		1.16	1.46	2.13	2.27	1.66	2.14
Roe's number		4.14	4.89	4.62	8.02	1.64	5.69
Yield to chip		42.57%	38.06%	47.29%	45.59%	45.65%	43.72%
Yield to 1m ³ wood		241 kg	244 kg	268 kg	286 kg	257 kg	274 kg

4. Bleached pulps.

The unbleached soda- and sulphite-pulps of each wood were bleached by the two stages method. After applying chlorine gas about amounting to 75% of theoretical bleachrequirement, which was calculated by "Roe-number", to the 20 g of unbleached air-dried pulps (corresponding to 18.5~18.8 g of absolute dried pulps), they were washed with 0.5% NaOH and water, and steeped in bleaching powder solution of about 0.5% for 1 hour to 4 hours at room-temperature. The chemical components of each bleached pulp are shown in Table V.

Table V. Bleached Pulps

Notation of cooking	No. 1 pulp		No. 2 pulp		No. 3 pulp	
Wood	Shui-chui-ryu	Howa-chui-ryu	Shui-chui-ryu	Howa-chui-ryu	Shui-chui-ryu	Howa-chui-ryu
Component						
α -cellulose	91.91%	90.79%	92.38%	88.17%	90.13%	89.25%
β -cellulose	5.52	6.79	4.55	6.14	5.97	6.7
γ -cellulose	2.57	2.40	3.07	5.69	3.91	4.05
Ash	0.54	0.46	0.25	0.26	0.24	0.36
Pentosan	15.18	14.40	6.79	6.60	5.05	5.34
Viscosity (centipoises)	11.6	8.9	23.5	15.0	9.3	5.3
Copper number	1.76	1.54	1.96	1.67	2.22	2.17
Yield to chip	34.6%	33.60%	41.76%	38.61%	41.97%	36.90%
Yield to 1 m ³ wood	195 kg	212 kg	236 kg	243 kg	237 kg	232 kg

Conclusion.

The sulphite pulps (No. 2 and No. 3) showed lower pentosan content than the soda pulp (No. 1).

With respect to the sulphite pulps, No. 3 had in each case (Shui-chui-ryu and Howa-chui-ryu) less pentosan, but larger copper number and lower specific viscosity than No. 2.

No. 1, No. 2 and No. 3 pulps showed the α -cellulose contents varying from 88.2% to 92.4%, and the bleached pulp yield per 1 m³ wood were from 195 kg to 243 kg.

In general the sulphite pulps (No. 2 and No. 3) were superior to the soda pulp (No. 1) with regard to the pulp yields and to the contents of α -cellulose, pentosan and ash.

The pulp wood, Shui-chui-ryu showed higher gravimetric pulp yield than Howa-chui-ryu. However, owing to the higher volume weight of Howa-chui-ryu, this showed the higher pulp yield than Shui-chui-ryu when compared with the same volume of woods.

Studies on the Yeasts found in "Miso."

(pp. 951~988)

By Masatoshi MOGI.

(The Brewing Laboratory of Noda Shōyū Co. Ltd., Noda-machi,
Chiba-ken, Japan. Received Apr. 27, 1938.)

The author has isolated 28 new strains of yeast from 44 samples of "Miso" which were produced in various districts of this country. Morphological and physiological properties of the yeasts were investigated in detail and they were accordingly classified as follows:—

<i>Saccharomyces</i>	<i>miso</i>	α	nov. sp.
"	"	"	var. 1~2 nov. sp., nov. var.
"	<i>miso</i>	β	nov. sp.
"	"	"	var. 1~4 nov. sp., nov. var.
"	<i>miso</i>	γ	nov. sp.
"	"	"	var. 1. nov. sp., nov. var.
<i>Zygosaccharomyces</i>	<i>miso</i>	α	nov. sp.
"	"	"	var. 1~2 nov. sp., nov. var.
"	<i>miso</i>	β	nov. sp.
"	"	"	var. 1~2 nov. sp., nov. var.
<i>Debaryomyces</i>	<i>miso</i>	"	nov. sp.
"	"	"	var. 1. nov. sp., nov. var.
<i>Hansenula</i>	<i>anomala</i>	"	var. <i>miso</i> nov. var.
<i>Torulopsis</i>	<i>miso</i>	α	nov. sp.
"	"	"	var. 1. nov. sp., nov. var.
"	<i>miso</i>	β	nov. sp.
"	"	"	var. 1~2 nov. sp., nov. var.
"	<i>miso</i>	γ	nov. sp.
"	"	"	var. 1~2 nov. sp., nov. var.

Torulopsis albida (Saito) Lodder var. *miso* nov. var.

The author wishes to express his deep gratitude to Dr. T. Takahashi and Dr. K. Sakaguchi for their kind advice and encouragement throughout this work.

An Improved Method for Estimating *in vitro* the Digestibility of Fish Meal.

(pp. 989~997)

By Tetuo TOMIYAMA and Saku ISHIKAWA.

(The Imperial Fisheries Institute, Received June 13, 1938.)

In order to shorten the time-interval for the digestion and also to omit such treatments prior to the digestion as grinding it and freeing it from fat, the following improvements of the usual method have been made.

1 g of a sample fish meal* is weighed and transferred to 200 cc Erlenmeyer flask. After being well mixed with 20 cc 0.1 *N* sodium hydroxide, left at room temperature for 30 minutes. Then, 50 cc 0.1 *N* HCl and 20 cc of a pepsin solution (containing 4 g Merck's pepsin in 100 cc 0.1 *N* HCl) are added, being thoroughly mixed. The flask is incubated for 24 hours in a thermostat which is adjusted at 40°. While the incubation, particularly within the first one or two hours, the flask must be shaken several times. After 24 hours' digestion, 10 cc of 30

* If a sample contains such coarse particles that unable one to make a homogeneous sampling, grind the sample by mortar until it can pass through a 30 mesh wire gauze. It is not necessary to pulverize it into so fine particle as the usual method requires.

per cent trichloroacetic acid are mixed and then filtered by dry filter paper. By the determination of total nitrogen made on 25 cc of the filtrate, the digestibility can be calculated by the following formula.

$$D = (n - n') \times \frac{100}{25} \times \frac{100}{N}$$

where, D : digestibility.

n : amount of nitrogen in a 25 cc filtered digest.

n' : amount of nitrogen contained in a 5 cc pepsin solution.

N : amount of nitrogen in 1 g sample fish meal.

A comparative study of the author's method with Wedemeyer's method as well as Oshima's method showed that a meal rather poor in fat (7.5%) gave nearly the same digestibility irrespectively of the methods employed, but that a meal rich in fat (14.3%) gave, by the present method, higher digestibility than by Oshima's or Wedemeyer's method.

The Effect of Heating or Dehydration during the Manufacture of Fish Meal upon its Digestibility.

(pp. 998~1000)

By Tetuo TOMIYAMA and Saku ISHIKAWA.

(The Imperial Fisheries Institute, Received June 13, 1938)

Contrary to the results obtained by Oya and his co-workers, the digestibility of carp meal did not show any change whether the carp muscle was dried at 100°, or at room temperature. Furthermore, the digestibility of the carp muscle coagulated at various temperatures ranging from 70° to 100° was the same as that of the fresh muscle. Only at one hour's digestion, the digestibility of the fresh muscle was found to be a little greater than that of the coagulated one.

Enzymatic Studies on Cereals (Part X.)

On the Separation of Amylases in Rice.

(pp 1001~1015)

By Gohei YAMAGISHI.

(Morioka Imperial College of Agriculture and Forestry, Received June 15, 1938)

In the previous papers of this series the author has maintained that there are starch-liquefying, starch-dextrifying, and starch-saccharifying enzymes existing independently in rice. It was the purpose of this investigation to prove this by separating these three amylases.

As the sample from which the amylases were prepared, I used the germinated rice, sprouted for about one week at 30°C.

The methods for determining the enzymic activity were essentially the same

as already described in the previous papers.

The results obtained from these experiments may be summarized as follows :

(1) The saccharifying amylase is most sensitive to heat, next the dextrifying amylase, and the liquefying amylase is most thermostable.

It was found that heating the enzyme extract for 5~10 minutes at 80°C was most suitable for the separation of these amylase.

(2) The degree of destruction of the enzyme activity caused by standing for 15 minutes at 5~10°C in different acidities, was most extreme for the liquefying amylase, most slight for the saccharifying amylase, and the dextrifying amylase lay between the two. For the separation of the three amylases, an acidity of about pH 2.5 was most favourable.

(3) Among the enzyme material obtained by the fractional precipitation with 0 to 40, 40 to 50, 50 to 60, 60 to 70, and 70 to 80 percent alcohol, the total amount of enzymes was most abundant in the product of 60~70% fraction, but the enzymic activity of a unite amount was most active in the precipitate produced by bringing the solution from 50 to 60 per cent alcohol by volume.

The fractional precipitation from the aqueous extract with alcohol was not the best means for separating one amylase from another.

(4) Using ammonium sulphate as a precipitant, the product obtained with 20~25% $(\text{NH}_4)_2\text{SO}_4$ was rich in the liquefying and dextrifying amylase, but 30~35% fraction was rich in the saccharifying amylase. The unit activity was too similar to the total activity.

This method, therefore, is effective in separating the amylases.

(5) When the enzyme extract, which was obtained by steeping at a different temperature (0~60°C), was used as a source of enzyme material and treated according to the procedures given above (1~4), by far better results would be obtained ; i. e., in order to obtain only the saccharifying amylase, the extraction at lower temperature was most suitable, whereas to obtain the dextrifying amylase, and especially, the liquefying amylase, the higher temperature (40~50°C) extraction was favourable.

(6) These experimental results supplied a further support to my earlier opinion that there are three kinds of amylases (the starch-splitting, dextrin-forming, and sugar-forming enzymes) in rice.

Studies on Ascorbic Acid (I).

On the distribution of ascorbic acid and glutathion
in the animal tissues and organs.

(pp. 1016~1026).

By Kichinosuke FUJIMURA

(The Institute of Chemical Research, Kyoto Imperial
University, Received June 15, 1938.)

By the modification of Wachholder's method (for the estimation of ascorbic acid)

and by Quensel's method (for the estimation of glutathion) these substances, which are distributed in the bodies of hens and carps, were estimated in oxidized and reduced forms.

By these results the relations were made clear between ascorbic acid and glutathion in the animalbody and hence the suggestion of the actions of ascorbic acid on glycolysis.

On the raw Materials of Tannins in Manchoukuo.

(pp. 1027~1036)

By Masuzo SHIKATA and Mitsugi CHIKASUYE.

(Kyoto Imperial University, Received June 8, 1938).

With the aim of estimating the barks of Manchurian trees as the resources of tannins, the following barks were investigated.

Names		Locality
<i>Betula costata</i> , Trantz.	(Chōsen-minebari)	Manchoukuo Kiturin-shō Ikorei
<i>Larix dahurica</i> , Turcz.	(Chōsen-Karamatu)	"
<i>Phellodendron amurense</i> , Rupr.	(Kibata)	"
<i>Syringa amurensis</i> , Rupr.	(Mancu-hasidoi)	"
<i>Juglans manchurica</i> , Max.	(Mancu-gurumi)	"
<i>Maackia amurensis</i> , Rupr.	(Karainu-enju)	"
<i>Quercus mongolica</i> , Fisch.	(Mongoli-nara)	"
<i>Fraxinus rhynchophylla</i> , Hance.	(Ōtoneriko)	"
<i>Fraxinus manchurica</i> , Rupr.	(Yatidamo)	"
<i>Acer mono</i> , Max.	(Itayakaede)	"
<i>Acer mandshuricum</i> , Max.	(Mancu-Kaede)	"
<i>Acer triflorum</i> , Kom.	(Onimegusuri)	"
<i>Populus tremula</i> , L. var. <i>Daviniano</i> Scheid.	(Chōsen-yamanarasi)	"
<i>Populus simoni</i> , Carr.	(Simonidoko)	"
<i>Tilia amurensis</i> , Kom.	(Amuru-Sinanoki)	"
<i>Tilia manchurica</i> , Rupr. et Max.	(Mancu-Sinanoki)	"
<i>Ulmus macrocarpa</i> , Hance.	(Ōnere)	"
<i>Ulmus laciniata</i> , Major.	(Oi yonire)	"

The contents of ash, cold water extract, hot water extract, 1% NaOH extract, and alcohol-benzene extract were determined.

For the analysis of tannins, the official methods of the society of Leather Trades' Chemists were applied.

Table I.

	Water		Total solids		Soluble solids		Non-Tannins		Tannins	
	air dry (%)	absolute dry (%)	air dry (%)	abs. dry (%)	air dry (%)	abs. dry (%)	air dry (%)	abs. dry (%)	air dry (%)	abs. dry (%)
<i>Betula costata</i> , Trantz.	12.59	—	4.95	5.66	4.65	5.33	2.46	2.61	2.19	2.52

<i>Larix dahurica</i> , Turcz.	16.06	—	8.30	9.88	7.60	9.05	1.92	2.29	5.68	6.76
<i>Phellodendron amurense</i> , Rupr.	13.65	—	11.20	12.97	10.20	11.84	7.60	8.80	2.60	3.04
<i>Syringa amurensis</i> , Rupr.	14.68	—	8.7	9.92	8.00	9.59	5.30	6.21	2.70	3.38
<i>Juglans manchurica</i> , Max.	13.57	—	15.30	19.70	9.60	11.22	5.32	6.15	4.28	5.07
<i>Maacki amurensis</i> , Rupr.	14.21	—	13.50	15.73	13.00	15.15	10.31	12.01	2.69	3.14
<i>Quercus mongolica</i> , Fisch.	15.53	—	14.80	17.52	14.60	17.28	5.46	6.46	9.18	10.72
<i>Fraxinus rhynchophylla</i> , Hance.	10.39	—	8.60	9.88	7.60	8.83	6.00	6.97	1.60	1.86
<i>Fraxinus manchurica</i> , Rupr.	15.37	—	9.45	11.17	7.94	9.43	4.80	5.67	3.14	3.76
<i>Acer mono</i> , Max.	15.88	—	5.90	7.01	4.80	5.71	2.20	2.62	2.60	3.09
<i>Acer mandschuricum</i> , Max.	14.47	—	9.00	10.52	8.00	9.35	3.70	4.32	4.30	5.03
<i>Acer triflorum</i> , Kom.	11.13	—	7.60	8.55	6.67	7.51	4.65	5.24	2.02	2.27
<i>Populus tremula</i> , Scheid.	12.24	—	13.90	15.91	13.30	15.06	9.95	11.28	3.34	3.78
<i>Populus simoni</i> , Carr.	13.11	—	4.60	5.24	4.10	4.66	2.10	2.53	2.00	2.13
<i>Tilia amurensis</i> , Kom.	13.35	—	3.40	3.90	2.80	3.21	2.26	2.59	0.54	0.62
<i>Tilia manchurica</i> , Rupr.	12.87	—	3.00	3.44	2.80	3.21	1.10	1.26	1.70	1.95
<i>Ulmus macrocarpa</i> , Hance.	14.31	—	1.70	1.98	1.50	1.76	0.50	0.58	1.00	1.17
<i>Ulmus laciniata</i> , Major.	12.83	—	10.00	11.47	9.20	10.55	4.10	4.70	5.10	5.85

The results of colour reactions are tabulated in Table II.

Table II.

	Colour of extracts,	Gelatine NaCl solution	Ferric chloride solution	Bromine water	Lime water
<i>Betula costata</i> , Trantz.	reddish brown	reddish brown pptd.	blue greenish-black	reddish brown pptd.	no change
<i>Larix dahurica</i> , Turcz.	bright red	"	blue greenish-black	"	"
<i>Phellodendron amurense</i> , Rupr.	yellowish brown	yellowish brown pptd.	greenish brown	yellowish brown pptd.	"
<i>Syringa manchurica</i> , Max.	reddish brown	"	light greenish brown	"	"
<i>Juglans manchurica</i> , Max.	bright red	"	blue black	no pptd.	"
<i>Maacki amurensis</i> , Rupr.	light yellowish brown	"	light greenish brown	yellowish brown pptd.	"
<i>Quercus mongolica</i> , Fisch.	reddish brown	"	blue greenish black	"	"
<i>Fraxinus rhynchophylla</i> , Hance.	"	"	light greenish brown	reddish brown pptd.	"
<i>Fraxinus manchurica</i> , Rupr.	green-yellowish brown	"	"	"	"
<i>Acer mono</i> , Max.	yellowish brown	"	"	yellowish brown pptd.	"
<i>Acer mandschuricum</i> , Max.	"	reddish brown pptd.	"	"	"
<i>Acer triflorum</i> , Kom.	"	yellowish brown pptd.	"	reddish brown pptd.	"
<i>Populus tremula</i> , Scheid.	"	"	greenish brown	no pptd.	"
<i>Populus simoni</i> , Carr.	"	"	"	reddish brown pptd.	"
<i>Tilia amurensis</i> , Kom.	"	"	light greenish brown	"	"
<i>Tilia manchurica</i> , Rupr.	"	"	"	"	"
<i>Ulmus macrocarpa</i> , Hance.	light yellow	"	"	"	"
<i>Ulmus laciniata</i> , Major.	bright red	reddish brown pptd.	greenish black	"	"

Table II. (Continued.)

	Conc. sulphuric acid	Added dil. sulphuric acid and then cold alcohol.		Added lead acetate and then acetic acid.	
		dil. sulphuric acid	cold alcohol	lead acetate	acetic acid
<i>Betula costata</i> , Trantz.	reddish brown pptd.	reddish brown pptd.	soluble	reddish brown pptd.	partly soluble
<i>Larix dahurica</i> , Turcz.	bright red	"	"	"	"
<i>Phellodendron amurense</i> , Rupr.	yellowish brown	yellowish brown pptd.	"	yellowish brown pptd.	"
<i>Syringa amurensis</i> , Rupr.	reddish purple	"	"	dark brown pptd.	"
<i>Juglans manchurica</i> , Max.	reddish brown	reddish brown pptd.	"	"	"
<i>Maackia amurensis</i> , Rupr.	"	yellowish brown pptd.	"	light yellow pptd.	"
<i>Quercus mongolica</i> , Fisch.	reddish purple	reddish brown pptd.	"	yellowish brown pptd.	"
<i>Fraxinus rhynchophylla</i> , Hance.	reddish brown	yellowish brown pptd.	"	"	"
<i>Fraxinus manchurica</i> , Rupr.	light red	"	"	dark brown pptd.	"
<i>Acer mono</i> , Max.	yellowish brown	reddish brown pptd.	"	yellowish brown pptd.	"
<i>Acer manschuricum</i> , Max.	"	"	"	reddish brown pptd.	"
<i>Acer triflorum</i> , Kom.	reddish brown	"	"	"	"
<i>Populus tremula</i> , Scheid.	"	"	"	"	"
<i>Populus simoni</i> , Carr.	yellowish brown	yellowish brown pptd.	"	yellowish brown pptd.	"
<i>Tilia amurensis</i> , Kom.	"	"	"	light brown pptd.	"
<i>Tilia manchurica</i> , Rupr.	"	"	"	"	"
<i>Ulmus macrocarpa</i> , Hance.	"	"	"	"	"
<i>Ulmus laciniata</i> , Major.	reddish brown	reddish brown pptd.	"	reddish brown pptd.	"

Alcohol Manufacture from Potato. (Part VIII~IX).

On the Alcoholic-Fermentation of Acid-Saccharified Potato Mash (I~II.)

(pp. 1037~1060)

By Hozumi OKADA.

(The Hokkaido Industrial Experiment Station, Received June 21, 1938.)

The author continued the proceeding works on the alcoholic-fermentation of acidsaccharified potato mash. The experimental results are summarized as follows :

(1) The addition of peptone or phosphoric acid salts to the acid-saccharified potato mash does not have any appreciable effect on the yield of alcohol.

(2) Without changing the amount of the acid used and the pressure supplied, the longer the saccharification-time, the more sluggish the fermentation is, and

there is a somewhat lower yield of alcohol.

(3) *Brennerihofe* Rasse XII, *Sacch. formosensis* Nakazawa and *Sacch. thermantionum* (792) give excellent fermentation results with the acid-saccharified potato mash.

(4) No detectable difference in fermentation can be observed between the acid-saccharified fresh potato-pulp mash and the dried pulp mash.

(5) The fresh potato, only crushed, requires a larger amount of acid for the saccharification compared with the fresh pulp and does not give good fermentation results.

(6) The small amount of un-saccharified carbohydrates in the fermented-mash is easily changed into fermentable sugar by means of the saccharolytic-enzyme of *Taka-diastase* and therefore it is considered a lower dextrine.

(7) The pressed juice from the crushed potato is rich in the nutritive substances of the yeast. The addition of the pressed juice facilitates the fermentation of the fresh or dried potato pulp mash.

(8) The acclimatization of the yeast to the acid-saccharified potato mash is the most important factor to obtain increased yield of alcohol and to reduce the time of induction-period.

Alcohol Manufacture from Potato. (X).

Seed-Cultures.

(pp. 1061~1071)

By T. YOSIMACHI.

(Hokkaido Industrial Experiment Station, Received July 13, 1938.)

For the fermentation on a semi-industrial scale, 46 Seed-cultures (Shubo) were investigated.

Avoiding any contamination, the mother yeast (acclimatized *Sacch. thermantionum*) was cultivated successively in Pasteur-flask, Carlsberg-fermenter and finally in a Seed-culture- (Shubo-) tank (360 L.).

The possibility of direct application of these seed-cultures (Shubo I) was verified as for the special cases, and they were usually introduced again to 3 cultures of equal magnitude (Shubo II) before the inoculation to 100 H.L. fermentation.

All half-way culture were observed to possess a very wide latitude in their inoculating period. The acid-sugar mash (pH 4.6~5.3, glucose 8.1~11.5%) without any addition of aiding materials resulted in seed-cultures of quite excellent character. As for the fermentation period of Shubo (including both I and II) 40 hrs. may be expected. The acid-sugar mash derived from raw potato always expelled in its fermentation compared to the mash prepared from the dried material, which was attributable to the presence of pressed juice. Those may be regarded as the characteristic results of this fermentation.

On the Optical Properties of the Fermentation Lactic Acids. (Part. VII).

Effect of the form of nitrogen upon the optical
properties of fermentation lactic acids.

(pp. 1072~1074)

By Hideo KATAGIRI and Kako KITAHARA.

(Agr. Chemical Laboratory, Kyoto Imperial University: Received June 18, 1938.)

In our previous paper [Biochem. J. **31**, 909 (1937)], it was ascertained by us that the specificity of the form of lactic acid produced by *Leuconostoc mesenteroides* var. Sake (*l*-former) and *Lactobacillus plantarum* sp. (*dl*-former) was a fixed character, whereas very noticeable modifications of the optical properties of the lactic acids were observed with *Lactobacillus* Sake (*d*-, *dl*- and *dl* + *d*-formers) where the conditions of fermentation were varied. And it was suggested that this modification of the form of the fermentation lactic acid was due to the amount of Racemiasse in the bacterial cells.

In the present paper, report will be made of the experiments which were carried out with four strains of *Lactobacillus* Sake and one strain of *Lactobacillus casei*, in order to get a more decisive explanation for the above modification which has hitherto seemed to be a peculiar phenomenon.

As sources of nitrogen, koji extract, bouillon, the mixture of koji extract and bouillon, fresh yeast extract and extract of autolysed yeast were chosen and glucose was employed for the type of sugar.

With extract of autolysed yeast or the mixture of koji extract and bouillon, *dl*-lactic acid was always obtained with all the *Lactobacilli*, while a large amount of *d*-lactic acid was produced when koji extract, bouillon or fresh yeast extract was employed.

Especially with *Lactobacillus* Sake No. 42, very remarkable modification was observed as already pointed out in our previous paper.

The amount of Racemiasse in the cells of *Lactob.* Sake No. 42 and 169 cultivated on koji extract or extract of autolysed yeast, was determined with Na-*l*-lactate in the presence of toluence.

Table I. Racemiasse in *Lactob.* Sake.

Bacterial cell			<i>d</i> -Lactic acid (g)		Racemization
No	Cultivated on	Nature	Initial	Residual	
42	Koji extract	<i>d</i> -former	1.71	1.83	0
	Autolysed yeast	<i>dl</i> - "	1.71	0.60	65%
169	Koji extract	<i>d</i> - "	1.62	1.70	0
	Autolysed yeast	<i>dl</i> + <i>d</i> (6%) - "	1.67	0.67	60%

Table I shows that the bacterial cells cultivated on koji extract did not reveal any racemization of lactic acid, while very remarkable racemization was observed with the cells obtained from extract of autolysed yeast.

It was further verified that racemization of lactic acid was never observed with the bacterial cells cultivated on koji extract even when extract of autolysed yeast was used instead of water, for the solvent of Na-*d*-lactate.

It is thus ascertained that the modification of the form of the fermentation lactic acid is due to the amount of Racemiasse in the bacterial cells, as suggested by us in the previous paper.

Bulletin of the Agricultural Chemical Society of Japan.**ABSTRACTS**

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(Pages refer to the Japanese originals of this volume unless otherwise noticed)

**On the Ascorbic Acid Formation from Mannose
in Plants and in Animal Bodies.**

(pp. 1075~1079)

By Tetutaro TADOKORO and Keizō ITō.

(Hokkaido Imperial University, Received June 29, 1938.)

Euler, Gartz and Malmberg mentioned the ascorbic acid formation from mannose in vitro, after the incubation at 37°C with animal tissues. The author intended to determine this power of the liver of the rat which was fed under different conditions. In the avitaminosis B₂ of the young rats, when their growth stopped, this power of liver became very weak while in that of the rats, injected with lactoflavin solution, this power of liver was increased enormously. In the alcoholism of young rats, when their growth stopped, this power of liver was not present, while in the liver of the rat, cured of alcoholism by the injection of lactoflavin, this power was recovered.

**Utilization of Irradiated Rice-bran-cake-kōji
for Poultry Feeding**

(pp. 1080~1084)

By Kisaburo YOKOYAMA and Ryōhei TAKATA.

(Laboratory for Food Industry, Ōsaka Imperial University, Received July 18, 1938.)

**On the Alcohol-Manufacture from Jerusalem
Artichoke (Part V~VII)**

(pp. 1085~1093)

By Toshinobu ASAI and Tetsuo YUKINOURA.

(Agricultural Chemical Laboratory, Morioka Agricultural College, Japan, Received June 29, 1938.)

Chemical constituents of Jerusalem artichoke were investigated and the optimum conditions on direct alcoholic fermentation of the fresh tuber were also studied, i. e., the selection of yeasts and the treatments of the material, etc.

The fermentation ratio attained to ca. 95% of the total sugar contained in the mash.

On the Varieties of *Aspergillus Oryzae* employed in Shōyu-Manufacture. Part II.

Influences of Temperature and pH upon Growth, etc.

(pp. 1094~1102)

By Masajiro KIBI.

(Microbiological Laboratory of Yamasa Shōyu Co. Ltd., Chōshi,
Chiba-ken; Received June 30, 1938.)

The present writer has investigated the following characters of the varieties which were studied morphologically in the previous work.

(1) Influence of temperature upon growth. Cultures on Czapek's solution agar were incubated at 20°, 25°, 30°, 33°, 35°, 37° and 40°C. Observations on mycelial growth and conidial development showed that each variety grew fastest between 33° and 37°C, and there was no noticeable difference between the varieties.

(2) Influence of pH upon growth. A large amount of Czapek's solution agar was made up and adjusted to different pH by the addition of lactic acid or sodium hydroxide. Growth of the fungi at various pH at 25°C were observed every day during a week. The critical pH range was found to be between 2.5 and 9.5 generally, but variety No. 6 was tolerant to acidity so high as below pH 2.

(3) Comparison of the utilization of various carbohydrates as sources of carbon.

(4) Comparison of the utilization of various nitrogen compounds.

Studies on the Manuring of *Juncus effusus* L. var. *decipiens* BUCH. Report I.

On the Manurial Value of Different Kinds of Nitrogen Compounds.

(pp. 1103~1112)

By H. SUTOH.

(The Prefectural School of Agriculture and Forestry,
Masuda, Simane, Japan, Received June 4, 1938.)

The rush, *Juncus effusus* L. var. *decipiens* BUCH, is cultivated in paddy-fields

from late Autumn (or early Spring) to early July (or early August). This crop develops very vigorously under suitable conditions. Since the part we utilise is its stem, the problem of the manure or of fertilizer for this rush is a very important one. And so the manure for this purpose is applied in quantity ranging from 3 to 4 times the quantity applied to the rice plant.

The author is at present investigating the value of manure on this plant from cultural and also biochemical viewpoints, but in this paper, only the results obtained as regards the manurial value of different kinds of nitrogen compounds will be reported.

Ammonium sulphate, sodium nitrate, cyanide (lime nitrogen), ammonium nitrate, urea, uric acid, hippuric acid and fish meal were used in this experiment as nitrogen sources, and the manurial value of each was compared with those obtained with other chemicals used in sand cultures. The conditions of growth, yield, and also the quality of the rush were investigated.

The following are some of the results obtained:

(1) The rush makes use of nitrogen of ammonium salt more than the nitrates. This crop may therefore be regarded as an ammonium-plant.

(2) Ammonium sulphate is much more effective in increasing the length and yield of the rush than other nitrogen compounds.

(3) Fish meal is found more effective than the others in producing superior rush.

(4) Urea is more effective than sodium nitrate.

(5) Lime nitrogen, is harmful even for such a hardy crop as the rush, unless it is very carefully treated.

(6) Hippuric acid seems to be harmful even for the vital function of the rush.

(7) Uric acid seems to have no injurious effect on the physiological process of the rush, its manurial value being less than that of sodium nitrate.

(8) The manurial values of the standard (100) of ammonium nitrogen were: sodium nitrate 58.8; ammonium nitrate 85.4; urea 63.4; uric acid 54.0, and fish meal 62.3.

Studies on the High Pressure Hydrogenation of Soya Bean Oil. VI.

On the Formation of Unsaturated Higher Fatty Alcohol.

(pp. 1113~1116)

By Y. SHINOZAKI and S. SUMI.

(Central Laboratory, South Manchuria Railway Co., Dairen Received June 4, 1938)

**Studies on the High Pressure Hydrogenation
of Soya Bean Oil. VII.**

On the Mechanism of the Formation of Higher Fatty Alcohol.

(pp. 1117~1122)

By Y. SHINOZAKI and S. SUMI.

(Central Laboratory, South Manchuria Railway Co., Dairen, Received June 4, 1938.)

**Studies on the High Pressure Hydrogenation
of Soya Bean Oil. VIII.**

On the Influence of the Conditions applied upon the
Formation of Unsaturated Higher Fatty Alcohol.

(pp. 1123~1128)

By Y. SHINOZAKI and S. ADACHI.

(Central Laboratory, South Manchuria Railway Co., Dairen, Received June 4, 1938.)

**Studies on the High Pressure Hydrogenation
of Soya Bean Oil. IX.**

On the Influence of the Preparation of Zn-Cr Catalyst
upon the Formation of Unsaturated Higher Fatty Alcohol.

(pp. 1129~1134)

By Y. SHINOZAKI and S. SUMI.

(Central Laboratory, South Manchuria Railway Co., Dairen, Received June 4, 1938.)

Studies on the Synthetic Wax-Esters.

- (1) The Influence of the Mixed Catalysts upon the Wax-Ester
Formation in High Pressure Hydrogenation.
- (2) The Solubilities of the Synthetic Wax-Esters in Organic Solvents.

(pp. 1135~1143)

By Y. SHINOZAKI and S. ADACHI.

(Central Laboratory, South Manchuria Railway Co., Dairen, Received June 4, 1938.)

On the Nutritive Value of Proline and Oxy-Proline.

Feeding Experiments with Amino Acid Mixture. (III)

(pp. 1144~1146)

By S. MAEDA, T. AIGASI and H. MATSUOKA.

(The Institute of Physical and Chemical Research, Received June 5, 1938.)

Alcohol Manufacture from Potato. (Part XI.)

On the Manufacture of Absolute-Alcohol on

Semi-Industrial Scale. (I)

(pp. 1147~1163)

By H. OKADA.

(The Hokkaido Industrial Experiment Station, Received July 13, 1938.)

The acid-saccharification and fermentation experiments were carried out on a semi-industrial scale using fresh potato and dried potato, the latter being made by using a rotatory kiln-dryer, as the raw material. 2,000~3,000 kg of the fresh potato and 500 kg of the dried potato were used, respectively, to prepare 3,600 L of the mash at a time. Using 20~23 kg of H_2SO_4 (Bé 65°) on the raw material, above described, the saccharifications at 3.5 atm. pressure for 45~100 minutes gave the best results. By this process 95.5% of the starch in the raw materials was converted into reducing-sugars. 10,800 L of the mash was fermented at a time. The acclimatized *Sacch. thermantitonus* was employed in these experiments. Inoculating 9% seed-culture to the mash, the best yield was obtained, and the fermentation was completed after 65 hours. 87% of the reducing sugar in the mash could be fermented and the yield of alcohol amounted to 58.4 I. % of the starch. Absolute alcohol (99.8%) was distilled by the continuously working rectifying-apparatus using trichlor-ethylene.

On the Content of 0.2 N HCl Soluble**Potash in Tyosen Soils. (IV)**

(pp. 1164~1174)

By Dr. MISTU-Hideo.

(Agricultural Experiment Station, Government General of Tyosen, Received Apr. 21, 1938.)

Studies on the Yeasts found in "Miso".

(pp. 1174~1206)

By Masatoshi MOGI.

(The Brewing Laboratory of Noda Shōyō Co., Ltd., Noda-Machi,
Chiba-Ken, Japan. Received Apr. 27, 1938.)

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Spectroscopical Studies of the Fluorescence in Sake.

(pp. 1207~1209)

By Tetutaro TADOKORO, Naomoto TAKASUGI and Keizo ITÔ.

(Hokkaido Imperial University, Received July 26, 1938.)

On the Ascorbic Acid Formation from Mannose in Plants and Animal Bodies II.

(pp. 1210~1212)

By Tetutaro TADOKORO and Keizo ITÔ.

(Hokkaido Imperial University, Received July 26, 1938.)

Alcohol Manufacture from Potato. (Part XII.) On the Manufacture of Absolute-Alcohol on Semi-Industrial Scale: (II.)

(pp. 1213~1227)

By H. OKADA.

(The Hokkaido Industrial Experiment Station, Received July 13, 1938.)

Studies on Vitamin C. (I)

On the Vitamin C Content in various Flowers and Leaves.

(pp. 1228~1236)

By Hisateru MITUDA.

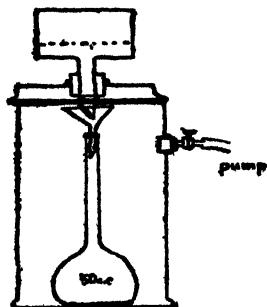
(Laboratory of Nutritional Chemistry, Kyoto Imp. University. Received July 26, 1938.)

Numerous studies on the vitamin C in fruits and vegetables have been made, but most of them have been concerned only with the use of these materials as foodstuffs. A plant produces and consumes vitamin in parts of itself. The vitamin in plant bodies has physiological significances for life-phenomena of the plant itself. These significances may be elucidated. With such a purpose I have entered on this study.

First, I have adopted the titrimetric determination of ascorbic acid with 2:6-dichlorophenolindophenol, which is generally used. In this case I have improved some points of the method, which are explained in the following liner.

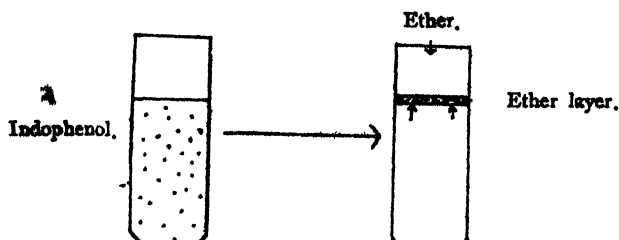
Formerly when it was difficult to obtain the juice by pressing the sample, I extracted it with acetic acid and separated the solution by centrifuging, but now, instead of centrifuging, I have used the apparatus such as is shown in the illustration, to filter it with the aid of suction.

Secondly, I have studied the elimination of the colouring matters of the sample, which is said to be the most difficult in the determination of vitamin C, and as a consequence, I have discovered that by mixing fuller's earth into the sample, not only the colouring matters of flowers but also those of fruits and urine can be eliminated easily and completely, and moreover, the vitamin C in them is neither destroyed nor absorbed by the fuller's earth.



Thirdly, I have discovered that 2:6-dichlorophenol-indophenol is more soluble in ether than in water. Until now, many experimenters have often been troubled in pointing out exactly the limit of the discolouration in the titrimetric determination of the ascorbic acid with 2:6-dichlorophenolindophenol.

But now, by adding a few drops of ether in the test-tube, the indophenol which remained coloured, penetrates into the layer of ether immediately. We know, therefore, by this means, whether the titration is complete or not.



The summary is as follows.

- 1). The vitamin C content in flowers and leaves is in great quantities and exceeds that in citrus fruits which have much more vitamin C than any other fruit.
- 2). Of the flowers, the vitamin C content in the petal is richer than in the stamens, the pistil, or in the calyx, and generally speaking, the red or the violet flower has a tendency to contain more dehydroascorbic acid than the white or the yellow ones.
- 3). Of the leaves, I have found, examining the leaves of the wistaria, that the young leaves contain much more vitamin C than the old ones, and this may be cited as an instance that vitamin C has the action of accelerating the growth of plants.
- 4). From olden times, it has been widely known that green tea contains a very great quantity of vitamin C, and I have found that "sencha" or "bancha" contains more vitamin C than "gyokuro" or black tea, after examining the vitamin C content in various kinds of tea. Therefore, I believe that this fact proves the relation between the sunlight and the vitamin C content in the tea-leaves.
- 5). The amaranth (*Amarantus tricolor*, L.) contains a great quantity of vitamin C. I have found an interesting consistent relation between its discolouration and the vitamin C content, that is to say, the fact that there is a counter-balanced relation between the decreasing of the quantity of the chlorophyll and that of vitamin C.

I think, this may sufficiently give a hint of how significant it is for the plant itself that it produces and consumes vitamin C.

In conclusion the writer must express his sincere thanks to Prof. Dr. K. Kondo for his sympathetic guidance and encouragement throughout the whole of the writer's studies, and to Prof. Dr. H. Kihara for kindly supplying the sample.

(July 1, 1938)

On the Relation between the Nitrogen Compounds of various Seeds of Crops and the Diastatic Power of their Malts.

Part I. Studies on Kaoliang.

(pp. 1237~1242)

By Hideo KATAGIRI and Narataro MUGIBAYASHI.

(Agr. Chemical Laboratory, Kyoto Imperial University; Received July 26, 1938.)

The forms of nitrogen, saccharifying and liquefying powers of both germinated (28~29 hours at 25°) and ungerminated seeds of various kinds of kaoliang were

Studies on the Cell-Wall Constituents of Soy-Bean. (I)

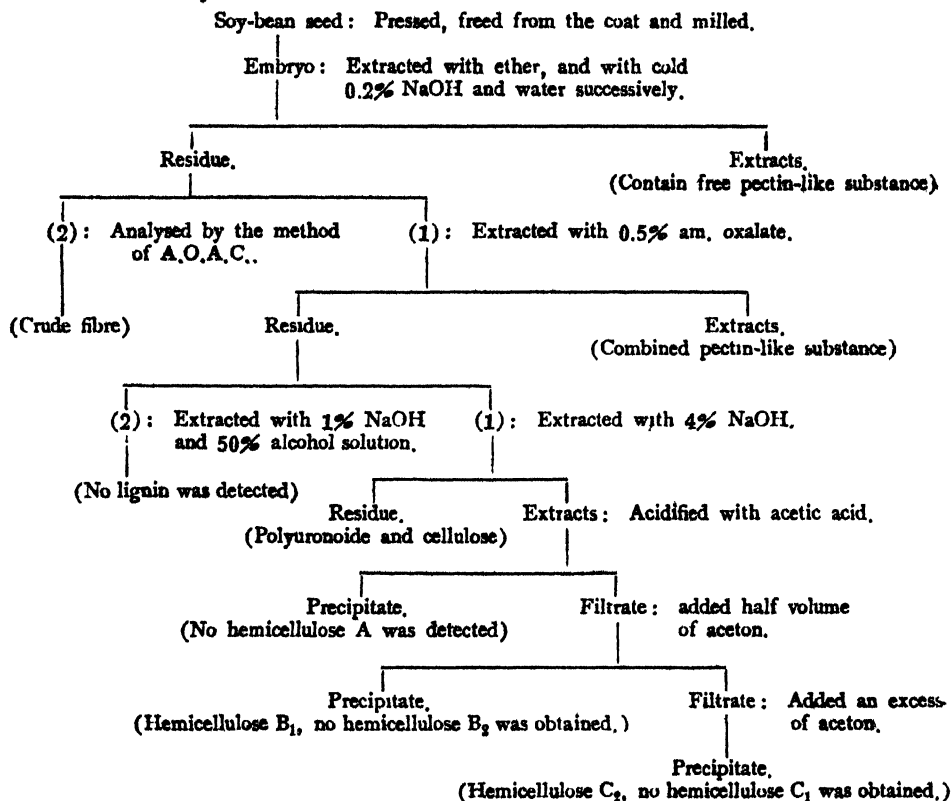
Cell-Wall Constituents of the Embryo of the Seed

(pp. 1257~1263)

By Shiuku SASAKI and Yoshimasa YAMASHITA.

(Agr. Chem. Laboratory, Kyushu Imperial University, Received July 16, 1938.)

The following scheme was employed for the isolation of the cell-wall constituents of the embryo.



The average yield in each fraction.

	Percentage of the embryo
Free pectin-like substance,	less than 2.0
Residue insoluble in 0.2% NaOH,	17.0
Combined pectin-like substance,	9.0
Hemicellulose B ₁ ,	2.0~3.1
Hemicellulose C ₂ ,	0.5~1.0
*Residue insoluble in 4% NaOH (Polyuronide, cellulose etc.),	4.6~5.4
Crude fibre,	3.38

* Residue in soluble in 4% NaOH contains crude fibre.

Biochemical Investigation of Mosaic Disease of Tobacco Plants. III.

On Catalase in the Leaves of Healthy and Mosaic Plants.

(pp. 1264~1270)

By Y. OKUDA and K. KATAI.

(Department of Agriculture of Kyusyu Imperial University, Fukuoka; Received Aug. 24, 1938.)

Statistic Studies of Soils. (I)

(pp. 1277~1284)

By Dr. MISU-Hideo.

(Agricultural Experiment Station, Government General of Tyosen, Received June 24, 1938.)

Berichtigung zur Arbeit: Ueber die technische Citronensäuregärung. I.

Mitt. von Nakazawa, Takeda und Nakano.

(Diese Zeitschrift 1937, 13, 52~62)

(s. 1285)

Von M. NAKANO.

(The Department of Industry, Government Research Institute,
Taiwan, Japan, Received Sept 20, 1938.)

Researches on the Electrolytic Reduction Potentials of Organic Compounds.-Part 26.

On the standard electrolytic reduction potential-pH curve.

(pp. 1286~1296)

By Isamu TACHI.

(Agricultural Chemical Institute, Kyoto Imperial University. Received Aug. 11, 1938.)

The relation of the standard electrolytic reduction potential, π'_0 , to pH of the electrolytic solution was theoretically discussed under consideration of the dissociation constants of a reducible compound as well as of its reduced form.

As an example of redox systems, neutral red was taken. The inclinations of the π'_0 -pH curve of neutral red were in fair agreement with theoretical values. Then the dissociation constants of neutral red and leuco neutral red were calculated from the inflection points of the π'_0 -pH curve.

Diss. const. of neutral red : $k_b = 3.2 \times 10^{-7}$ at 25°C

Diss. const. of leuco form : $k_s = 1.3 \times 10^{-9}$ at 25°C

Diss. const. of leuco form : $k_a = 3.2 \times 10^{-9}$ at 25°C

It was suggested theoretically that the leuco form of neutral red was an amphotelyte.

As an example of irreversible reduction systems, benzoylacetone was taken. The inclinations of the π_0' -pH curve of benzoylacetone did not agree so well with the theory as the case of neutral red, but the shape of the curve was approximately near to the theoretical form. Therefore, we were able to describe the inflection points of the π_0' -pH curve to show the dissociation constants of benzoylacetone. Then the values were calculated.

Diss. const. of benzoylacetone : $k_a = 3.2 \times 10^{-7}$ at 25°C

The first dissociation constant of the reduced form of benzoylacetone :

$k_a = 4.0 \times 10^{-4}$ at 25°C

The second dissociation constant of the reduced form of benzoylacetone :

$k_a = 1.0 \times 10^{-11}$ at 25°C .

Studies on the Yeasts found in "Miso".

(pp. 1297~1324)

(The Brewing Laboratory of Noda Shōyū Co. Ltd., Noda-Machi, Chiba-Ken, Japan, Received Apr. 27, 1938.)

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noticed)

Some New Ingredients of Brown Algae, VIII.

On the brown compounds of phosphorus.

(pp. 1325 ~ 1331)

By K. SIRAHAHA.

(Hokkaido Imperial University, Received Aug. 8, 1938.)

Four brown compounds (α , β , γ and δ) of phosphorus were isolated.

When they were saponified with alkali, (easily producing amine odour) glycerin, fatty acids, a few compounds of phosphorus, and unvolatile base (?) were produced with large amounts of acidic brown pigment. But they did not produce sugar by hydrolyzing with dilute acid. They had the same components as if they were phosphatides.

Brown pigments contained about 1.4% of pyrol nitrogen and they had a reducing action for Fehling's solution. And the phloroglucin reaction by kali fusion was also active. The brown pigment seemed like a substance derived from chlorophyll or tannin. However, the original brown substance behaved as a lipoid.

On the Relation between the Nitrogen Compounds of various Seeds of Crops and the Diastatic Power of their Malts.

Part III. Studies on Glutinous and Non-glutinous Rice.

(pp. 1332 ~ 1334)

By Hideo KATAGIRI and Narataro MUGIBAYASHI.

(Agr. Chemical Laboratory, Kyoto Imperial University; Received July 29, 1938.)

Experiments were carried out with the seeds of four species of non-glutinous and of two species of glutinous rice.

During the germination, glutelin and hordein nitrogen were always decreased

while total soluble, proteose-peptone, especially non-protein nitrogen were increased. The fluctuation of albumin and globulin nitrogen varied with the species.

The activity of maltase and liquefying power of germinated seeds were both found to be low, viz., nearly the same as those of peas (see Part II).

Very different (nearly five times) saccharifying powers of the germinated seeds were observed with the species, and any parallel relation was not found between saccharifying and liquefying powers nor the activity of maltase.

It is interesting to point out that the saccharifying power of the germinated seeds could be estimated from the amount of albumin nitrogen of ungerminated seeds including glutinous and non-glutinous rice, as was already suggested with the seeds of kaoliang and mung beans (see Part I and II).

Studies on Vitamin C. (II)

On the Variation of the Vitamin C Content in some Fruits.

(pp. 1335~1340)

By Hisateru MITUDA.

(Laboratory of Nutritional Chemistry, Kyoto Imp. University, Received July 26, 1938)

There is no need to say that the various vitamin contents in natural products increase and decrease with the difference of the internal and external conditions of the fruit.

It is exactly the same with vitamin C.

At one time, Tomiji Matuoka⁽¹⁾ studied the effect of light upon the production of vitamin C during germination of the seed.

According to Feller's⁽²⁾ and Batchelder and Overholser's⁽³⁾ experiments on apples, it is an established fact that vitamin C is more completely synthesized in apples and the parts of them exposed to the sun, than in those in the shade.

The writer has studied the relation between the sunlight and the vitamin C content in pears, persimmons and oranges, and found that the vitamin C content of the fruits is in proportion to the quantity of the sunlight received during ripening.

In other words, the fruits which ripened in sunny places, contained more vitamin C than those which ripened in shady places.

I believe this fact is of much benefit, not only to scientific researches, but also for practical use.

In conclusion the writer must express his sincere thanks to Prof. Dr. K. Kon-do for his sympathetic guidance and encouragement throughout the whole of the writer's studies, and to Prof. Dr. I. Namikawa for kindly supplying the sample.

Literature

- (1) Tomiji Matuoka: *Memoirs of the College of Agr. Kyoto Imp. University*, **9** (1930), **24** (1932), **35** (1935).

- (2) Fellers: J. Agr. Research., 46 (1933), 1039.
(3) Batchelder and Overholser: J. Agr. Research, 53 (1936), 547

(July 9, 1938.)

On the Formation of Ascorbic Acid from Mannose in Plants and in Animal Bodies. III.

(pp. 1341~1342)

By Tetutaro TADOKORO and Keizō ITŌ.

(The Hokkaido Imperial University, Received Aug. 27, 1938.)

On the Retting of Vegetable Fibre Materials.

Part VI. The Selection of useful Aerobes for the
Bacterial Retting of Hemp Fibre Materials.

(pp. 1343~1347)

By Hideo KATAGIRI and Tosio NAKAHAMA.

(Agr. Chemical Laboratory, Kyoto Imperial University and
Kanebo Silk Factory; Received Sept. 2, 1938.)

More effective retting in separating pectin from the fibre bundles and of increasing white content of the fibre was attained by the aerobic process when it was compared with the natural retting of hemp fibre materials.

From the retting vat, twelve strains of aerobic bacteria were isolated, and their morphological characteristics were investigated.

When pure fermentations of hemp fibre materials were carried out with these bacteria isolated as above, one strain (No. 4) of coccus and one strain (No. 10) of bacillus were selected as the most useful organisms, since with each of these two strains, non-fibrous substances including pectin, mannan, galactan and crude protein were always remarkably removed from the fibre bundles.

On the Retting of Vegetable Fibre Materials.

Part VII. The Characteristics of the useful Bacteria
for the Aerobic Retting of Hemp Fibre Materials. •

(pp. 1348~1352)

By Hideo KATAGIRI and Tosio NAKAHAMA.

(Agr. Chemical Laboratory, Kyoto Imperial University and
Kanebo Silk Factory; Received Sept. 2, 1938.)

One of the useful aerobes (see Part VI) was classified as a new species as *Micrococcus cannabis*, since the characteristics of the bacteria were found not to be

the same as those of *Micrococcus subcitreus*, *Migula* or *Micrococcus luteolus*, Irwin and Harrison, in the reduction of nitrate, formation of surface film on liquid cultures and for the optimum temperatures of multiplication.

The other useful aerobe was found to reveal a similar nature to *Bacillus subtilis*, Cohn. However, glycogen was not found in the bacterial cells, milk was not changed, hydrogen sulphide was not produced, and the production of acid from glucose or sucrose was not observed using this bacteria.

It was therefore concluded that the bacteria was again a new species and named *Bacillus cannabis*.

Nutritional Chemistry of Flowers. (Part II)

Compositions of Cauliflowers and Vitamins in Flowers of Double Cherry-Blossoms, Rape-Seed Flowers and Cauliflowers.

(pp. 1353~1363)

By Sakae SHINANO and Masuji MORIMOTO.

(Laboratory of Nutritional Chemistry, Kyoto Imp. University. Received Aug. 27, 1938)

1) The general compositions of the flowers of double cherry-blossoms, rape-seedflowers and cauliflowers were analysed with the result that these flowers were found to consist chiefly of a large amount of nitrogenous substances and carbohydrates besides 80~90% of water.

2) The nitrogenous substances and carbohydrates in the cauliflowers were studied, and it was shown that the greater part of the nitrogenous substances were of different natures from the seedprotein. Moreover, we have proved, by the osazone test, the presence of glucose and fructose in the water soluble part of the cauliflowers.

3) The flowers of double cherry-blossoms, rape-seedflowers and cauliflowers were used as vitamin sources in the feeding of albinorats, and it was proved that these flowers contained a suitable amount of vitamin A, B-complex and E-active substance.

We have assumed, according to the results of the feeding experiments, that the content of vitamin B in these flowers occurred in the following order: Cauliflowers > Flowers of double cherry-blossoms > Rape-seedflowers.

Chemical Studies on Japanese Coccidae. (XX.)

On Carbohydrates and Waxes of *Tachardina theae* Green et Mann.

(pp. 1364~1370)

By K. KAWANO and R. MARUYAMA.

(Laboratory of Osaka Factory of Sankyo Co. Ltd., Received Sept. 5, 1938)

Researches on the Electrolytic Reduction Potentials of Organic Compounds.—Part 27.

The electrolytic reduction potential of furfural.

(pp. 1371~1374)

By Isamu TACHI.

(Agricultural Chemical Institute, Kyoto Imperial University, Received Sept. 5, 1938)

(1) The standard electrolytic reduction potential (π'_0) and the saturation current of furfural were determined in various pH solutions by the polarographic method.

(2) The saturation current changed with the pH values of the electrolytic solutions and showed a maximum value in the case of pH=8.0.

(3) It was suggested from the polarograms that the reduction of furfural took place with two stages continuously in the pH range from 6 to 8.

(4) The π_0 -pH curve of furfural consisted of three linear parts, of which inclinations were $d\pi'_0/dpH = -0.07$ in the pH range from 1 to 6, $d\pi'_0/dpH = -0.03$ in the pH range from 7 to 10 and $d\pi'_0/dpH = 0.0$ in higher pH range than 10.

(5) When the analysis of furfural is carried out by the polarographic method, it is preferable that the qualitative analysis should be carried out with a strongly alkaline solution owing to a constant value of π'_0 , and the quantitative analysis should be carried out with a solution, of which pH value is 8, and if the content is very large, strongly acidic as well as strongly alkaline solutions are available.

Studies on the Amylo-Process for the Production of Alcohol from Potatoes. (I)

(pp. 1375~1386)

By Shinji DOI and Rikizo TAKAHASHI.

(Tokyo Imperial University, Received July 17, 1933)

Biochemical Investigation of Mosaic Disease of Tobacco Plants. IV.

On Oxydase, Peroxydase and Amylase in the Leaves of
Healthy and Mosaic Plants.

(pp. 1387~1396)

By Y. OKUDA, K. KATAI and T. HIBI.

(Department of Agriculture of Kyusyu Imperial University, Fukuoka Received Aug 24, 1938.)

Some New Ingredients of Brown Algae, IX.

A brown pigment.

(pp. 1397~1403)

By K. SIRAHAHA.

(Hokkaido Imperial University, Received Aug 8, 1938)

A large amount of brown pigment was produced by saponification of the brown compound δ which was mentioned in Report VIII. It had the same nature as the other pigments which were obtained by saponification of brown compounds α , β and γ . In this case, further purification was made and it was separated into three substances: ether soluble phytochlorine like substance, alcohol soluble substance (a) and insoluble (b).

The pigment (b) contained somewhat more oxygen than (a) and the ash content of (a) was larger than (b). The ash was mainly magnesium and a little sodium.

When pigment (a) added hydrogen, its alcohol solution diminished the viscosity of the solution. Pigments (a) and (b) had also physiological properties: they accelerated the development of moulds and inhibited that of lactobacillus.

The Composition of Soy-bean Oil Residue.

(pp. 1404~1409)

By Shigeki MORI.

(Kondo Laboratory, Chemical Institute, Kyoto Imperial University, Received Sept. 19, 1938)

Statistic Studies of Soils. (II)

(pp. 1410~1412)

By Dr. Hideo MISHU.

(Agricultural Experiment Station, Government General of Iyosen, Received June 24, 1938)

Studies on the Nutritional Chemistry of Cuttle Fishes. (I)

(pp. 1413~1422)

By YASU HATAKORI.

(Kondo Laboratory, Chemical Institute, Kyoto Imperial University, Received Sept 20, 1938)

Studies on the Utilization and Digestion by Silkworms of the Carbohydrates contained in Mulberry Leaves. (Part V)

The Influence on the Activity of Digestive Enzymes of Silkworms when bred on Mulberry Leaves to which Cane-sugar was added in different Proportions.

(pp 1423~1425)

By K. KATO

(The Sericultural Experiment Institute of Gifu Prefecture, Received Oct 1, 1938)

As the results of experiments on the influence on the digestive enzymes of silkworms we found that the activity of amylase was almost unchanged and the activities of invertase in the stomach membrane and protease were influenced.

Effect of Heating on Yeast Glutathion.

(Biochemical Studies on Glutathion. The Sixth Report)

(pp. 1426~1432)

By Masayoshi OGAWA.

(Department of Nutrition, College of Medicine, Nippon University

Received Oct 4, 1938)

The author has already reported as to the biochemical studies on glutathion. In the present communication the author determined the glutathion content of beer yeast and studied the effects of heating on yeast glutathion. Method of Okuda

Table I. GSH crystallized as cuprous salt from yeast.

Hours heating	Heating condition	dry state (100°C)	wet state (88°C pH. 6.0)
0		100.0	100.0
1		—	10.3
5		—	9.6
7		97.3	—
10		—	0
23		27.5	—
41		0	—

and the author for the determination of glutathion, and method of Hopkins for the precipitation of cuprous glutathion were used, with the following results. (Table I)

From the above results, in the dry state yeast glutathion seems to exist in fairly stable condition for the heating effect, but in the wet state it seems to be easily destroyed.

Table II. The determination value of yeast glutathion which was boiled with water for several minutes.

Minutes boiling	Glutathion determined (mg %)					
	GSH		GS•SG		Total	
0.	409	100	347	100	756	100
1.	567	138.6	268	77.2	835	110.4
5.	567	138.6	284	81.8	851	112.5
10.	567	138.6	276	79.5	843	111.5
15.	567	138.6	260	74.9	827	109.3
20.	509	124.4	200	57.6	709	93.7

The determination value of glutathion of the yeast which was boiled with water for several minutes (1~5) was increased in some degree. The increase is believed to be due to the liberation of glutathion from a compound which is soluble in water but insoluble in acid (S. S. A.).

Bulletin of the Agricultural Chemical Society of Japan.

TRANSACTIONS

Über die Vergärbarkeit des Zuckerrohrsaftes.

Von Y. IWATA, S. SUZUKI und K. YAMAFUJI.

Aus dem Institut für Zuckerforschung in Tainan.

(Eingegangen am 27, 8, 1938.)

Der Zuckerrohrsaft ist bisher in Japan nur für die Herstellung des Rohrzuckers verwendet worden. Er ist aber auch für die Spritusfabrikation ein gutes Material. Um den starken Bedarf an absolutem Alkohol in unserem Lande zu decken, sind wir in die Notwendigkeit versetzt, aus diesem Material Spiritus zu gewinnen. Wir haben daher eine eingehende Untersuchung über die Vergärung des Zuckerrohrsaftes vorgenommen.

1. Veränderungen der chemischen Bestandteile des Zuckerrohrsaftes durch Erhitzung.

1) Veränderungen der Zuckerarten.

Zur Sterilisierung des Zuckerrohrsaftes müssen solche Bedingungen gewählt werden, unter welchen die Zersetzung vergarbarer Zuckerarten möglichst gering ist. Deshalb haben wir den Zuckerrohrsaft unter verschiedenen Bedingungen erhitzt und dann die Abnahme des Zuckergehaltes ermittelt (Tabelle I).

Tabelle I.

Erhit- zungsdauer in Std.	Erhitzungstemperatur 100°				Abnahme des Rohrzuckers in %	Abnahme des Gesamt- zuckers in %
	Reduzierender Zucker in g. pro 100 ccm Saft		Gesamtzucker in g. pro 100 ccm Saft			
	Vor dem Erhitzen	Nach dem Erhitzen	Vor dem Erhitzen	Nach dem Erhitzen		
1/2	0,107	0,133	17,23	17,23	0,15	0
1	0,479	1,009	19,02	19,02	2,79	0
2	1,572	2,219	16,52	16,52	3,52	0
3	3,536	5,320	22,16	22,16	8,04	0,15
5	1,341	3,604	22,87	22,84	9,89	0,15

Wir konnten keine Aenderung der Wasserstoffionenkonzentration des Zuckerrohrsaftes ($\text{pH}=5,0$ bis $5,5$) durch Erhitzen beobachten.

2) Veränderungen der Stickstoffverbindungen.

Bei der alkoholischen Garung des Zuckerrohrsaftes sind die Stickstoffverbindungen im Saft, als Nährstoffe der Hefe unentbehrlich. Es ist deswegen notwendig, zu untersuchen, ob sich bei der Sterilisierung der Stickstoffgehalt des Rohrsaftes vermindert.

Das reife Zuckerrohr wurde gepresst, der erhaltene Saft zentrifugiert und dann die klare Lösung auf 100° erhitzt. Nach einer Stunde wurde die Lösung zentrifugiert und die Stickstoffmenge im Zentrifugat bestimmt. Die Bestimmung des Aminostickstoffs wurde nach der Methode von Van Slyke ausgeführt (Tabelle II).

Tabelle II.

Stengel	Gesamtstickstoff in %			Aminostickstoff in %		
	Vor dem Erhitzen	Nach dem Erhitzen	Abnahme durch Erhitzen	Vor dem Erhitzen	Nach dem Erhitzen	Abnahme durch Erhitzen
Der obere Teil	0,061	0,036	0,025	0,011	0,008	0,003
Die Mitte	0,024	0,012	0,012	0,005	0,004	0,001
Der untere Teil	0,043	0,021	0,022	0,005	0,005	0,002

2. Sterilisierung des Zuckerrohrsaftes.

Um die geeignetsten Bedingungen für die Sterilisierung des Rohrsaftes zu finden, haben wir einige Versuche über den Einfluss der Erhitzung auf die Mikroben im Saft durchgeführt.

Der frisch gewonnene Zuckerrohrsaft wurde bis zu verschiedenen Temperaturen erhitzt und nach bestimmten Zeiten wurde 1 ccm des Saftes auf einen Kojiagarboden in einer Glasschale gebracht. Die Schale wurde einige Tagen bei 30° stehengelassen und dann die Kolonien der Mikroben gezählt. Die Zahlen in der Tabelle III veranschaulichen die Mikrobenzahl von je 1 ccm erhitztem Saft.

Tabelle III.

Erhitzungs- temperatur	Erhitzungsdauer in Minuten			
	15	20	36	60
70	153	36	—	28
75	117	18	—	8
80	79	31	21	8
85	40	28	68	9

90	56	18	15	3
95	29	12	8	2
100	10	5	0	0

3. Vergarbarkeit der aus verschiedenen Teilen des Zuckerrohrs erhaltenen Säfte.

Wie in Tabelle II gezeigt wurde, ist der Stickstoffgehalt des oberen Teils des Zuckerrohrs ziemlich grösser als derjenige der anderen Teile. Es wurde nun untersucht, welcher Teil des Zuckerrohrs als Nahrstoff der Hefe vorzuziehen sei.

Das Zuckerrohr wurde in drei Teile geteilt und alsdann einzeln gepresst. Der erhaltene Saft wurde auf 10° Bg verdünnt und nach dem Sterilisieren in den Saft *Sacch. formosensis* (=Hefe) eingepflegt. Durch Bestimmung der sich entwickelten Kohlensäure wurde der Verlauf der Gärung beobachtet. Die Zahlen in Tabelle IV bedeuten den Prozentsatz des vergorenen Zuckers.

Tabelle IV.

Gärdauer in Std.	14 Monate alter Rohsaft			25 Monate alter Rohsaft		
	Wipfel	Stengel	Wurzel	Wipfel	Stengel	Wurzel
17	33,4	13,4	16,1	25,4	4,7	6,7
25	56,6	20,5	28,8	45,5	8,7	12,1
42	92,0	37,7	52,8	76,1	16,6	23,7
50	95,8	44,7	61,9	82,5	19,1	27,1
65	98,6	57,2	77,9	89,0	28,5	28,8
89	—	74,2	95,3	89,5	40,8	53,7

4. Beeinflussung der Vergarbarkeit des Zuckerrohrsaftes durch Zusatz von Stickstoff.

Aus den Versuchen in Tabellen II und IV geht hervor, dass zwischen dem Stickstoffgehalt des Rohrsaftes und dem Vergarungsgrad desselben, enge Beziehungen bestehen. Da die Stickstoffmenge im Saft sehr gering ist, scheint es möglich zu sein, durch Zusetzen von stickstoffhaltigen Substanzen die Vergärung des Saftes beschleunigt wird.

Es wurde zunächst der Einfluss welcher Ammoniumsulfat auf die Vergarbarkeit des Zuckerrohrsaftes hat untersucht. Zu diesem Zweck wurde eine Menge Saft aus überreifen Zuckerrohren bereitgehalten. Von eintägiger Kojiauszugskultur wurde mit einer Öse *Sacch. formosensis* auf 100 ccm sterilisierte nSaftes im Gargefäß übergepflegt und dazu wurde noch nach 68 Stunden 50 mg Ammoniumsulfat zugesetzt. Bei der Kontrolle wurde kein Salz hinzugefügt (Tabelle V).

Tabelle V.

Gärdauer in Std	Stengel		Wurzel		Wipfel	
	Mit Salz	Ohne Salz	Mit Salz	Ohne Salz	Ohne Salz	Ohne Salz
	Vergärungs- grad in %	Vergärungs- grad in %	Vergärungs- grad in %	Vergärungs- grad in %	Entwickelte Kohlensäure in g	Vergärungs- grad in %
20	9,2	8,9	11,0	—	1,09	26,6
44	29,6	27,7	33,4	30,6	2,08	85,6
68	46,9	44,6	52,1	47,2	2,13	91,6
72	50,4	46,9	55,5	51,7	2,14	91,8
100	83,5	63,5	91,1	69,4	—	—
122	88,1	73,1	96,8	80,8	—	—

Wie aus Tabelle V ersichtlich ist, wird die alkoholische Garung der Zuckerrohrsaft durch Zusatz von geringer Menge von Ammoniumsulfat bedeutend befördert. Um dann die geeignetste Konzentration des Ammoniumsulfats für die Garung zu finden, wurden die Garversuche unter Zusatz verschiedener Mengen dieses Salzes ausgeführt. Die Ergebnisse der Garungsverlaufs wurden mit dem Prozentsatz des vergorenen Zuckers verglichen (Tabelle VI).

Tabelle VI.

Gärdauer in Std	g Ammoniumsulfat in 100 ccm Saft aus Stengel					
	0	0,02	0,05	0,1	0,5	1,0
23	11,2	19,8	28,0	36,0	36,7	35,6
47	29,3	49,1	64,3	71,8	71,0	70,2
71	44,6	70,7	85,5	83,3	80,5	80,8
96	57,9	84,7	94,4	88,5	81,9	84,8
143	74,6	95,7	98,6	92,6	87,2	88,3

Es wurde dann die Beeinflussung der Garung durch Ammoniumnitrat untersucht (Tabelle VII).

Tabelle VII.

Gärdauer in Std	g Ammoniumnitrat in 100 ccm Saft aus Stengel					
	0	0,01	0,03	0,06	0,30	0,58
20	3,2	6,9	9,3	10,3	12,5	11,5
43	19,5	28,7	50,3	50,3	48,5	46,3
68	33,9	48,3	67,1	78,1	65,3	61,5
92	47,0	63,9	84,2	91,4	72,6	69,6
114	57,8	75,0	93,2	96,6	76,4	73,0

5. Beeinflussung der Vergarbarkeit des Zuckerrohrsaftes durch Zusatz von Phosphat.

Der Phosphorgehalt des Zuckerrohrsaftes (etwa 0,05%) ist sehr gering im Vergleich mit demjenigen von künstlichen Nährboden für die Hefe (0,2 bis 0,5%). Wir haben daher untersucht, ob durch Zusetzen von Kaliumphosphat der Vergarungsgrad gesteigert wird (Tabelle VIII).

Tabelle VIII.

Gärdauer in Std.	mg Kaliumphosphat in 100 ccm Saft aus Stengel					
	0	5	15	25	50	250
24	4,9	5,1	4,3	3,8	4,0	3,7
72	26,0	26,6	22,6	22,2	22,3	18,7
120	43,8	44,7	38,8	38,2	38,9	32,7
192	63,8	64,7	58,8	57,4	58,8	49,5

6. Beeinflussung der Vergarbarkeit des Zuckerrohrsaftes durch Zusatz von Stickstoff und Phosphat.

Tabelle VIII zeigt, dass keine Gärungsbeschleunigung durch Zusetzen von Phosphat stattfindet. Nun wurde zum Zuckerrohrsaft, neben Kaliumphosphat, noch Ammoniumsulfat zugesetzt und nach verschiedenen Zeiten wurde die entwickelte Kohlensäure bestimmt (Tabelle IX).

Tabelle IX.

Gärdauer in Std	g Ammoniumphosphat (A) oder Kaliumphosphat (B) in 100 ccm Saft					
	A 0 B 0	A 0,05 B 0,00	A 0,05 B 0,01	A 0,05 B 0,10	A 0,10 B 0,01	A 0,10 B 0,10
24	3,9	5,2	5,9	7,8	4,0	6,3
47	12,6	31,5	31,4	33,7	31,0	39,5
71	21,8	33,9	53,3	54,4	61,3	66,9
95	30,2	70,4	70,0	70,0	80,6	82,1
120	37,9	81,6	82,7	81,6	87,6	87,3

7. Einfluss der Verdünnung des Zuckerrohrsaftes auf den Gärungsverlauf.

Bekanntlich wird die alkoholische Gärung durch die Zuckermenge in der Nährlösung beträchtlich beeinflusst. Für die Alkoholherstellung aus dem Zuckerrohr ist es notwendig, den Saft passend zu verdünnen.

Der aus 9 Monate altem Zuckerrohr gewonnene Saft wurde mit Wasser ver-

duunt und die Garungsversuche bei 30° ausgeführt. Die Zahlen in Tabellen X und XI veranschaulichen den Prozentsatz des Vergarungsgrades.

Tabelle X.

Gärdauer in Std.	Verdünnungsgrad, Saft : Wasser					
	1 : 0	9 : 1	4 : 1	6 : 5	4 : 6	1 : 4
24	14,6	14,2	12,6	16,0	13,9	12,1
48	36,9	39,5	39,0	38,1	36,1	25,5
72	55,0	55,4	55,0	53,3	49,4	33,0
96	67,2	68,0	67,5	64,1	58,4	38,0
120	72,0	73,9	73,7	70,6	63,7	40,2

Der Zuckerrohrsaft enthält, wie die Versuche in Tabellen II, V und VI zeigen, nicht die genügende Menge von Stickstoffverbindungen, welche für die vollkommene Vergarung der Zuckerarten im Saft erforderlich ist. Deshalb wurden die Versuche weiter mit den verdünnten Säften, welche 0,05% Ammoniumsulfat enthalten, ausgeführt. Die erzielten Ergebnisse sind in Tabelle XI wiedergegeben.

Tabelle XI.

Gärdauer in Std.	Verdünnungsgrad, Saft : Wasser					
	1 : 0	4 : 1	7 : 3	1 : 1	3 : 7	1 : 9
24	24,8	29,8	34,2	36,6	43,1	42,4
40	47,7	54,0	62,2	68,5	79,6	70,2
60	67,1	74,1	82,8	89,6	97,1	—
80	78,9	83,9	89,9	94,6	99,4	—
100	83,4	88,8	93,5	—	—	—

8. Vergarbarkeit von den aus verschiedenen Rassen des Zuckerrohrs erhaltenen Säften.

Die chemischen Zusammensetzungen und die Eigenschaften von aus verschiedenen Rassen gewonnenen Säften sind nicht immer die gleichen. Solche Rassen, welche sich gut für die Zuckerfabrikation eignen, sind nicht gerade gutes Material für die Alkoholherstellung. Die chemischen Bestandteile des Saftes aus einigen Rassen sind in Tabelle XII einzeln dargestellt.

Tabelle XII.

	Die verwendeten Rassen					
	F 108	F 89	F 60	2883 POJ	2878 POJ	2725 POJ
Bllg des Saftes	19,8	22,3	20,4	19,7	19,4	20,3
pH des Saftes	6,0	5,9	6,0	6,1	5,9	6,1

Truckensubstanz in %	22,31	24,34	23,08	21,92	23,13	22,97
Rohrzucker in %	16,90	20,72	17,07	16,92	15,83	17,85
Reduzierender Zucker in %	0,36	0,28	0,29	0,59	0,34	0,28
Asche in %	0,17	0,22	0,21	0,25	0,23	0,29
Phosphorsäure in %	0,039	0,092	0,075	0,056	0,031	0,071
Gesamtstickstoff in %	0,025	0,016	0,034	0,028	0,018	0,025

Die Garversuche wurden mit 50 ccm. dieser Saft durchgeföhrt. Die erhaltenen Ergebnisse zeigt Tabelle XIII.

Tabelle XIII.

	F 108	F 89	F 60	2883 POJ	2878 POJ	2725 POJ
pH nach der Gärung	4,2	4,4	4,0	4,0	4,0	3,9
g Zucker nach der Gärung	2,85	3,94	3,20	1,94	2,88	1,90
Entwickelte Kohlensäure in g	1,87	1,95	2,00	1,98	1,95	2,10
Entstandenes Alkohol in g	3,49	3,65	3,74	3,75	3,68	4,11
Vergärungsgrad in %	75,27	64,63	80,63	79,73	84,66	84,27

9. Vergarbarkeit des aus der ersten Presse gewonnenen Saftes.

Für die Saftgewinnung bei Fabrikation wurden die Zuckerrohren mittels der kontinuierlichen Pressen ausgepresst. Da die aus verschiedenen Pressen erhaltenen Saft verschiedene Eigenschaften haben, muss auch in der Vergarbarkeit dieser Saft ein Unterschied bestehen. Der Vergärungsgrad des Saftes der ersten Auspressung ist in Tabelle XIV wiedergegeben.

Tabelle XIV.

Gärdauer in Std	mg Ammoniumsulfat (A) oder Kaliumphosphat (B) in 50 ccm Saft					
	A 0	A 25	A 50	A 100	A 50	A 100
	B 0	B 0	B 0	B 0	B 5	B 10
24	3,3	13,3	13,9	17,5	20,8	13,3
54	21,9	56,4	63,0	70,9	75,9	78,7
78	32,9	73,3	72,6	72,3	85,3	81,7
100	40,8	77,8	73,0	75,1	88,3	83,1

Bei der chemischen Analyse der Saft ergaben sich die folgenden Resultate (Tabelle XV).

Tabelle XV.

Ammonium- sulfat in mg	Kalium- phosphat in mg	pH nach der Gärung	pH nach der Gärung	g Zucker vor der Gärung	g Zucker nach der Gärung	Entstandenes Alkohol in g
0	0	5,0	4,0	9,06	3,70	2,82
25	0	5,0	3,6	9,06	1,22	4,07

50	0	5,0	3,1	9,06	1,55	3,94
100	0	5,0	2,7	9,06	1,89	3,90
50	5	5,0	3,4	9,06	0,53	4,32
100	10	5,0	3,0	9,06	0,64	4,25

10. Vergarbarkeit des aus der zweiten Presse gewonnen Saftes.

Der Rückstand der ersten Pressung wurde wieder ohne Anrühren mit Wasser ausgepresst. Im allgemeinen ist der durch die erste Auspressung erhaltenen Saft das geeignetste Material für die Rohrzuckerfabrikation; dieser Saft zeigt aber wegen des geringen Gehaltes an Stickstoff keinen befriedigenden Vergarungsgrad. Die Ergebnisse der Garungsversuche am Saft aus der zweiten Presse sind in Tabelle XVI zusammengestellt.

Tabelle XVI.

Gärdauer in Std.	mg Ammoniumsulfat (A) oder Kalumphosphat (B) in 50 ccm Saft					
	A 0 B 0	A 25 B 5	A 50 B 0	A 50 B 5	A 100 B 5	A 100 B 10
25	0,8	0,2	1,4	0,6	0,1	1,5
47	24,0	40,2	64,0	52,0	45,9	52,8
70	44,7	74,0	90,4	89,5	83,0	86,0
94	61,3	87,5	94,8	96,2	89,7	92,1
118	73,9	92,1	95,5	99,9	91,0	93,3

11. Vergarbarkeit des aus der dritten Presse gewonnenen Saftes.

Wie aus Tabelle XVII zu erschen ist, besitzt der durch die letzte Pressung erhaltene Saft den niedrigsten Zuckergehalt, aber den höchsten Stickstoffgehalt.

Tabelle XVII.

Saft aus	Bllg	pH	Gesamt- Zucker in %	Gesamt- Stickstoff in %
der ersten Presse	20,1	5,0	18,11	0,015
der zweiten Presse	20,1	5,0	17,68	0,024
der dritten Presse	19,8	5,1	17,12	0,038

Der Vergarungsgrad des Saftes aus der dritten Presse wird in Tabelle XVIII gezeigt.

Tabelle XVIII.

Gärdauer in Std.	mg Ammoniumsulfat (A) oder Kaliumphosphat (B) in 50 ccm Saft					
	A 0 B 0	A 25 B 0	A 25 B 5	A 50 B 0	A 50 B 5	A 100 R 0
24	0,1	0,4	0,7	0,3	0,6	0,2
48	27,2	63,6	71,5	77 0	77,3	67,3
72	56,6	95,9	98,9	96,5	98,0	93,5
90	74,1	97,9	99,7	97,6	98,2	94,6

Zusammenfassung.

1. Bei der Erhitzung des Zuckerrohrsafts auf 100° vermehrt sich der Invertzucker allmählich; selbst nach 5 Stunde langem Stehenlassen bei 100° findet keine Verminderung der Gesamtzuckermenge statt.

2. Durch Erhitzen auf 100° werden 30 bis 50% der Gesamtstickstoffmenge im Saft unloslich; dabei verwandeln sich auch 10 bis 25% der Aminostickstoffverbindungen in losliche.

3. Zwischen dem Vergarungsgrad der Zuckerarten im Zuckerrohrsaft und dem Stickstoffgehalt des Saftes sind enge Beziehungen erkennbar. Der Saft aus dem oberen Teil des Stengels oder aus unreifem Zuckerrohr wird durch die Hefe kraftiger vergoren, als derjenige aus dem unteren Teil oder aus überreifem Rohr; dabei ist der Stickstoffgehalt der erstgenannten Saftes hoher als derjenige der letztgenannten.

4. Der Vergarungsgrad des Zuckerrohrsafts wird durch Zusetzen von geringer Menge von Ammoniumsulfat sehr bedeutend gesteigert. Die Beschleunigungswirkung von Ammoniumnitrat auf die Garung des Saftes ist geringer als die von Ammoniumsulfat. Der Zusatz von Kaliumphosphat allein bringt keine Beforderung der alkoholischen Garung hervor.

5. Bei einer Zuckerkonzentration von 12 bis 15% findet die starkste alkoholische Garung des Zuckerrohrsaftes statt. Wenn der Rohrsaft mit Ammoniumsulfat versetzt wird, ergibt sich die maximale Vergarung bei einer geringeren Zuckerkonzentration.

6. In der Vergarbarkeit des Saftes bei den verschiedenen Rassen des Zuckerrohrs besteht eine bestimmte Reihenfolge. Fügt man aber zum Zuckerrohrsaft Ammoniumsulfat hinzu, so findet bei allen Rassen eine fast vollständige Vergarung statt.

7. Die alkoholische Garung ist bei dem durch die letzte Pressung erhaltenen Saft kraftiger, als bei dem durch die erste Pressung erhaltenen. Zur vollständigen Vergarung der Zuckerarten im Saft aus unreifem Zuckerrohr macht sich auf jeden Fall kein Zusatz von Ammoniumsulfat notwendig.

ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noticed)

Some New Ingredients of Brown Algae, X.

Brown phosphorus-containing compounds and brown pigments.

(pp. 1433~1436)

By K. SIRAHAHA.

(Hokkaido Imperial University Received Aug. 8, 1938)

This was discussed in detail in the former Reports VIII and IX. The author proposed the name of "phycophosphatide" for the brown phosphorus containing compounds which were mentioned in Report VIII and "phycophain" for the brown pigment which was reported in Report IX. The latter name has been used from early times.

On the Selection of Grape Varieties for Wine Making.

(pp. 1437~1448)

By Hideo KAWAKAMI and Sctuo MATUMIYA.

(Kotubukiya, Received Sept 20, 1938)

The success of wine making may depend on a proper selection of grape varieties from which the wines are made. The present authors have studied to find out suitable varieties for wine making in this country. The grapes used were all produced in Iwanohara vineyard, Nigata prefecture, and consisted of 55 known varieties and crosses of European and American origin, 2 Japanese native varieties, as well as 20 new crosses which were obtained by Zembei Kawakami after his valuable efforts for these thirty years.

The summary of the results obtained are as follows:—

1) As for the proportional contents of acid and sugar in the grapes used for the fermentation, the following relations were found.

The Quantity of Sugar/the Q of Acids	less than		more than	
	16	16~29	29	
Numbers of Varieties	38	43	5	

2) The varieties which gave wines of rather high quality were as follows:—B.J.*, Bi.A.*, Be.A.*, M.F.*, B.Q., M.BA.* and Perry for red wine; R.S* for white wine.

The common or bulk wine varieties :— Folle Noire, Cambell Early, Adirondack, Beacon, Sado native grape, W.B. Munson, Big Extra, Bailey, Carman, Mills, Jack, Hybrid Franc, E.F.*, B.S.* and B.G.* for red wine; Early Madeleine, Lady Washington, Unknown species No. 1, B.A.*, W.B.* and R.Q.* for white wine.

3) The new varieties, which were produced by Z. Kawakami at Iwanohara vineyard, gave wines of higher qualities and especially of deep colour.

Studies on the Lactic Acid Bacteria isolated from Milk and Dairy Products.

(pp. 1449~1465)

By KAKUO KITAHARA.

(Department of Agriculture, Kyoto Imperial University. Received Oct. 4, 1938)

From 18 samples of milk and dairy products including butter, cheese and various kinds of milk, the author isolated 72 strains of lactic acid formers and classified them according successively to the following characters;

(1) Gram's staining, (2) form, (3) catalase reaction, (4) manner of fermentation of glucose, (5) fermentable sugars.

Thus the classification of the bacteria was proposed as follows:

Group I. *Streptococcus* (38 strains):

Sc. cremoris (3), *Sc. thermophilus* (9), *Sc. lactis* (9), *Sc. faecalis* (13),
Sc. glycerinaceus (2), *Sc. liquefaciens* (2).

Group II. *Leuconostoc* (8 strains):

Leuc. dextranicum (5), *Leuc. mesenteroides* α -type (2), *Leuc. mesenteroides* β -type (1).

Group III. *Tetracoccus liquefaciens* (9 strains).

Group IV. *Lactobacillus* (*Streptobacterium*) (10 strains):

L. casei (6), *L. acidophilus* (3), *L. bulgaricus* (1).

Group V. *Lactobacillus* (*Betabacterium*) (2 strains):

L. brevis α -type (1), *L. brevis* β -type (1).

Group VI. *Bacterium caseolyticum* (3 strains).

Group VII. *Escherichia coli* (2 strains).

The newly recorded species, *Bacterium caseolyticum* (Group VI) was found to be a type of abnormal lactic acid formers such as *Tetracoccus* or *Microbacterium*, but it differed greatly from them in its form and size. Dextro-lactic acid was produced from glucose, maltose, lactose, fructose, glycerol and galactose but no lactic acid was obtained from sucrose nor mannose. The optimum temperature and the thermal death point were found to be 40° and 80~90° respectively. It was suggested that the bacteria would enter into the reaction involved in cheese-ripening, since it revealed not only the remarkable decomposition of protein but

* denotes Kawakami's new varieties.

also the production of cheesy odour, when it was cultured into milk.

In the previous paper, Dr. Katagiri and the present author pointed out that fructose was decomposed by the action of *Leuconostoc*, according partly to the first formula $C_6H_{12}O_6 = C_3H_6O_3 + C_2H_5OH + CO_2$, and mainly to the second formula $3C_6H_{12}O_6 + H_2O = 2C_6H_{14}O_6 + C_3H_6O_3 + CH_3COOH + CO_2$. In the present paper, the author confirmed this point of view not only with *Leuconostoc*, but also with *Betabacterium*, and proposed that heterofermenters could be classified into mannitol formers (α -type) and ethanol formers (β -type), owing to their specificity in preference to either the second or the first formula.

Statistic Studies of Soils. (II)

(pp. 1466~1468)

By Dr. MISU-Hideo.

(Agricultural Experiment Station, Government General of Tyosen.

Received June 24, 1938.)

Studies on the Utilization and Digestion by Silkworms of the Carbohydrates contained in Mulberry Leaves. (Part VI)

The Influence on the activity of blood enzyme and blood nitrogen composition of Silkworms when bred on mulberry leaves to which cane sugar was added in different proportions.

(pp. 1469~1478)

By K. KATO and S. MIWA.

(The Sericultural Experiment Institute of Gifu Prefecture. Received Oct. 1, 1938.)

As the results of the experiment on the influence on the activity of blood enzymes and the blood nitrogen composition of silkworms when bred on mulberry leaves to which cane-sugar was added in different proportions, we found that the activities of invertase, lipase, phenolase, and catalase are influenced and the blood nitrogen composition, determined as total nitrogen, non-protein nitrogen, amino nitrogen, and basic nitrogen, is changed.

Studies on Bios. Part I.

Effects of β -Alanine, Meso-inositol, Vitamin B₁, B₂ and B₆ on *Saccharomyces cerevisiae*.

(pp. 1479~1484)

By Nobusada OKOTI.

(Agricultural-chemical Laboratory, Faculty of Agriculture, Tokyo Imperial University. Received Oct. 11, 1938.)

The potency of β -Alanine, Meso-inositol, Vitamin B₁, B₂ and B₆ as "bios" was examined on *Saccharomyces cerevisiae*, but none of these seemed to be "bios", for they were far less effective than an unknown ingredient of various natural substances.

Studies on Vitamin C. (III)

Ascorbic acid oxidase.

(pp. 1485~1492)

By Hisateru MITUDA.

(Laboratory of Nutritional Chemistry, Kyoto Imp. University.

Received July 26, 1938.)

I have studied vitamin C in flowers and leaves, and given attention to its abundance in them, and tried to isolate it from these abundant natural products.

In isolating vitamin C, much of it is oxidized and destroyed by the ascorbic acid oxidase, and the yield decreases.

Therefore, in order to extend my knowledge first on this oxidase, I have entered on the study described in the above title.

- (1) I examined the preparation and isolated the powerful oxidase.
- (2) Establishing the specificity of oxidase, I examined the exactitude of the foregoing determination.
- (3) Vitamin C is very unstable to oxidation, but it is extremely stable to heating, and I have found that brief heating destroys ascorbic acid oxidase, and preserves vitamin C completely.

This is a very interesting problem of nutritive chemistry.

In conclusion the writer must express his sincere thanks to Prof. Dr. K. Kondo for his sympathetic guidance and encouragement throughout the whole of the writer's studies.

(July 15, 1938.)

Studies on the Nutritional Chemistry of Cuttle Fishes. (II)

(pp. 1493~1500)

By Yasu HATAKOSHI.

(Kondo Laboratory, Chemical Institute, Kyoto Imperial University.

Received Sept. 20, 1938.)

Röntgenographische Untersuchung über die Myzel der Schimmelpilze.

(ss. 1501~1506)

Von Yukichi GO, Seiji NAKAMURA, und Saburo NAGATA.

(Institut für Faserforschung, Kaiserliche Universität zu Osaka,

Angeg. am Sept. 29, 1938.)

Es wurden röntgenographische Versuche über eine Reihe von Schimmelpilzen—*Mucor Mucedo*, *Rhizopus nodosus*, *Rhizopus péka I*, *Rhizopus péka II*, *Rhizopus japonicus* und *Phycomyces nitens*—durchgeführt.

Züchtungsbedingungen :

1. Nahrlosung : 5 gr Saccharose, 1 gr NaNO_3 , 0.5 gr KH_2PO_4 und 0.25 gr MgSO_4 wurden in 100 cc Wasser gelöst.
2. Temperature : 25°C .
3. Zeitdauer : 2~3 Wochen.

Die Röntgendiagramme der Sporangientrager zeigen bei allen Sorten die Faserstruktur mit mehr oder weniger grosser Deutlichkeit. Bei *Mucor* und *Phycomyces* konnte ziemlich Faserstruktur nachgewiesen werden, aber bei *Rhizopus* war es wegen des schwachen und kurzen Sporangientragers nicht möglich die Faserstruktur nachzuweisen.

Tabelle I.

M. Mucedo		Rh. japonicus		Rh. péka I		Rh. péka II		Rh. nodosus		Phycomyces nitens		Krabbe (Endoskelett)	
d	Intensität	d	Intensität	d	Intensität	d	Intensität	d	Intensität	d	Intensität	d	Intensität
9~107	diffus	9~10	diffus	9~10	diffus	9~10	diffus	9~10	diffus	9~10	diffus	9.52	s, st
6 12	st.											7.05	m.
4 43	st	4 60	st.	4.60	st.	4.60	st.	4 66	st.	5.19	m.	5 16	m.
3 96	m.									4.62	st.	4.60	s, st.
3 71	m.												
3.38	schw.	3 38	m.	3 41	schw.								
3.10	m.					3.41	schw.	3 38	m.	3.37	st.	3.41	s, st.
2.79	s, st.												
										2.82	schw.	2 81	schw.
2.43	m.			2.59	schw.	2 59	schw.			2 57	schw.	2.59	schw.
2.24	st.												
2.11	schw.												
2.04	schw.												
1.90	schw.												
1.84	schw.												

In Tabelle I sind Netzebenenabstände von allen Reflexionen angegeben und wie man darauf deutlich sieht, zeigen die Sporangientrager bei *Rhizopus* und *Phycomyces* dieselben Diagramme wie tierisches Chitin, aber nur bei *Mucor* findet man ein Charakteristisches Diagramm das sich unterscheidet von Chitin.

Die Chitindiagramme die Heyn⁽¹⁾ bei der Untersuchung der Sporangientrager des *Phycomyces* erhielt, stimmen mit unseren Ergebnissen überein.

Abgesehen von den Sporangientragern, zeigen die übrigen Myzelen stets das

(1) A. N. J. Heyn : *Protoplasma*, 23, 372 (1936).

Chitindiagramm bei allen Sorten des Pilzes. (Tabelle II)

Tabelle II.

M Mucedo		Rh. japonicus		Rh. péka I		Rh. péka II		Rh. nidosus		Phycomyces nitens	
d	Intensität	d	Intensität	d	Intensität	d	Intensität	d	Intensität	d	Intensität
9.52	st.	9.52	st	9.52	st.	9.52	st.	9.52	st.	9.56	st.
4.60	s st.	4.60	s, st	4.60	s st.	4.60	s, st.	4.60	s, st.	4.62	s st.
3.41	st	3.41	st.	3.41	st.	3.41	st.	3.41	st.	3.41	m.
2.79	schw	2.78	schw					2.79	schw.		
2.59	schw	2.60	schw.	2.59	schw	2.59	schw	2.60	schw		

Glutathion Content of Commercial Yeast Preparations.

Biochemical Studies on Glutathion. The Seventh Report.

(pp. 1507~1511)

By Masayoshi OGAWA.

(Department of Nutrition, College of Medicine Nippon University,

Received Oct. 4, 1938)

The author already reported as to the heating effect on yeast glutathion. In this present communication the author determined the glutathion content of 10 commercial preparations of yeast. For the determination of glutathion the method of Okuda and the author was used, with the following results.

Glutathion content of commercial yeast preparations.

mg % of glutathion	Bi	Fe	Wa	Or	Ifo	1 b	7y	Cu	B	He	mean		dry beer yeast	
GSH	77	88	255	234	69	417	710	182	326	184	262	(56)	475	(100)
GS.SG	60	613	257	183	136	227	78	331	108	265	227	(74)	304	(100)
total	137	701	512	417	205	646	788	513	434	449	489	(62)	779	(100)

As shown in the above table in these yeast preparations each GSH and GS.SG content decreased in large degree and total glutathion ratio showed only 62% compared with those of dry beer yeast.

The Utilization of the By-products of Soy-beans. (Part IV.)

(pp. 1512~1516)

By Yosaburo IWASA.

(Dept. of Food Chemistry, Osaka Municipal Hyg. Lab.,

Received Oct. 5, 1938)

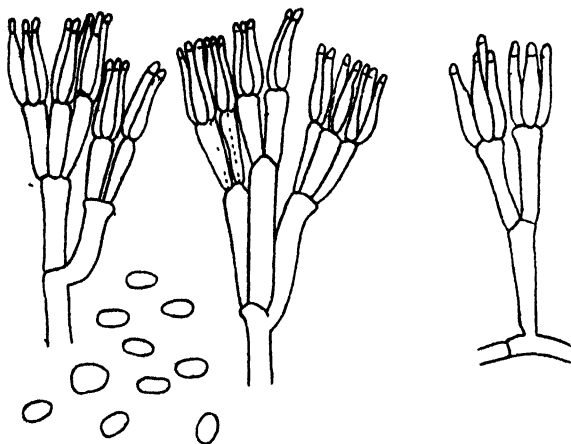
On the Production of Ethylenoxide- α - β -dicarboxylic Acid by Moulds (Part IV).

(pp. 1517~1522)

Kin-ichiro SAKAGUCHI and Tatsuitiro INOUE.

(The Tokyo Imperial University. Received Nov. 7, 1938.)

In the previous paper⁽¹⁾ the authors reported that they have found a species of *Monilia* which form ethylenoxide- α - β -dicarboxylic acid from glucose. They now have isolated another mould, which caused the new fermentation, from a bottled grape juice. The properties of the mould are as follows:



Penicillium viniferum nov. sp.

Colonies on Koji-extract agar from dark olive buff or deep olive buff to olive brown (according to Ridgway's Colour Standards), loosely felted, spreading over the whole substratum, about 1 mm deep, with reverse pale yellow and agar coloured dark purple with age; conidiophores 54~138 μ long by 5 μ , smooth walled and asymmetrically

branched; branches 15~28 μ long, two or three at a node; metulae 14~15 μ by 3 μ with apices slightly enlarged, 2~3 in the group; sterigmata about 12~20 μ by 1.5~3 μ , in verticils of about 3 to 4; conidia elliptical or rarely ovoid, 2~3 μ by 4~6 μ , smooth; conidial chains parallel, not in columnar masses.

Optimum temperature for growth 32~34°C and the inhibition below 12°C or above 44°C. The optimum pH 4.4~6.9. It grows well on common culture media for moulds. Amylase, emulsin, proteinase (pepsin and papain type), lab-enzyme, lipase, catalase and zymase are formed. It ferments starch, glycogen, dextrin, raffinose, saccharose, maltose, lactose, glucose, fructose, mannose and galactose.

Über Kahlmhefe-verhütenden Bestandteil im verseifbaren Anteil von Tamariöl.

(ss. 1523~1525)

Von Kenji MIYAJI und Motozo OGURI.

(Landwirtschaftliche Hochschule zu Gifu, Angeg. am Oct. 13, 1938.)

(1) Sakaguchi and Inoue: Bull. Agr. Chem. Soc. Jap., Vol. 14, No. 3, 1938.

